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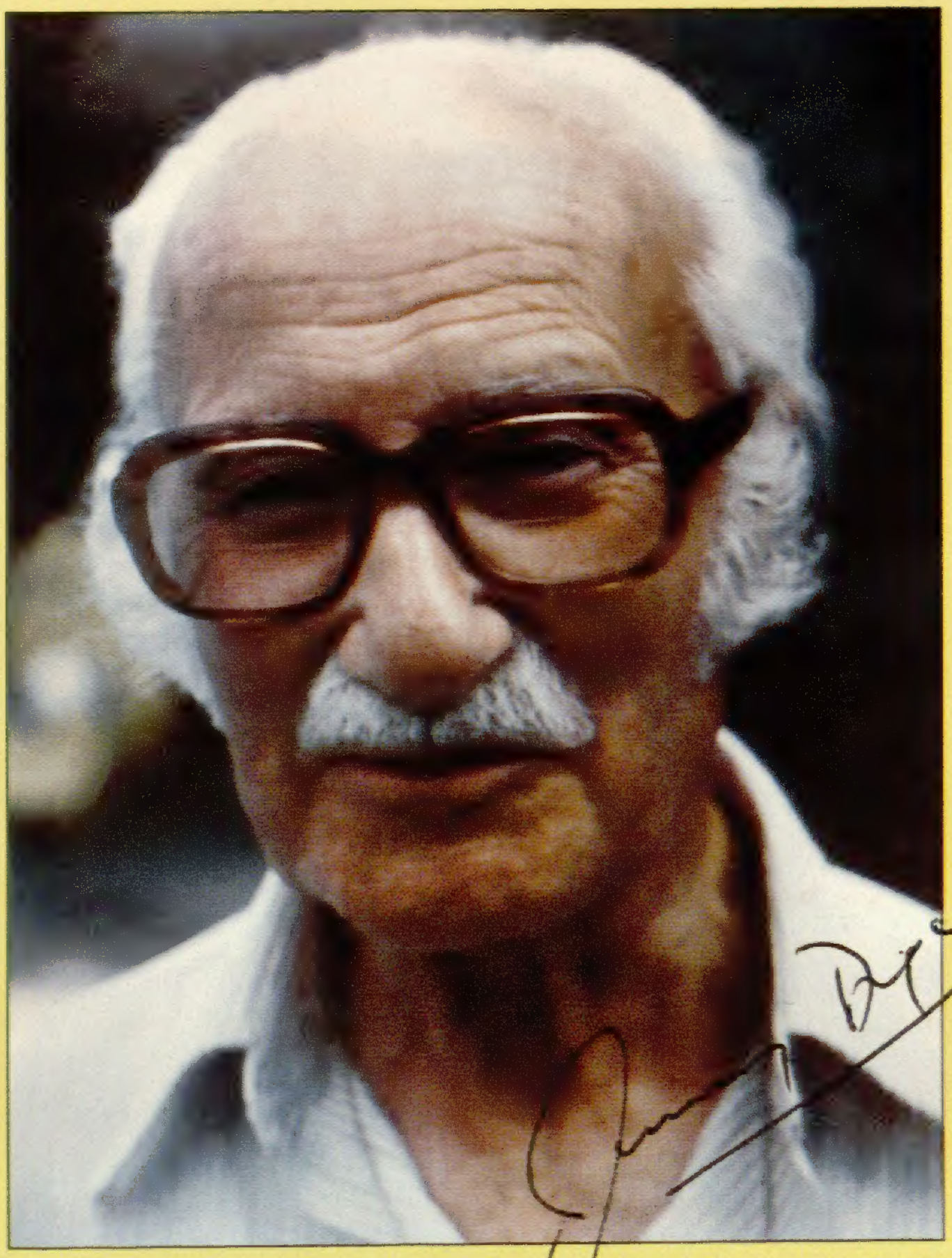
PTERIDOLOGIST

Edited by

Barry A. Thomas



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THE BRITISH PTERIDOLOGICAL SOCIETY

THE BRITISH PTERIDOLOGICAL SOCIETY
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The BRITISH PTERIDOLOGICAL SOCIETY was founded in 1891 and today continues as a focus for fern enthusiasts. It provides a wide range of information about ferns through the medium of its publications and other literature. It also organises formal talks, informal discussions, field meetings, garden visits, plant exchanges, a spore exchange scheme and fern book sales. The Society has a wide membership which includes gardeners, nurserymen and botanists, both amateur and professional. The Society's journals, the *Fern Gazette, Pteridologist* and *Bulletin,* are published annually. The *Fern Gazette* publishes matter chiefly of specialist interest on international pteridology, the *Pteridologist,* topics of more general appeal, and the *Bulletin,* Society business and meetings reports. **www site:** http:Nwww.nhm.ac.uk/hosted_sites/bps/

Membership is open to all interested in ferns and fern-allies. **SUBSCRIPTION RATES** (due on 1st January each year) are Full Personal Members £15, Personal Members not receiving the *Fern Gazette* £12, Student Members £9, Subscribing Institutions £25. Family membership in any category is an additional £2. Applications for membership should be sent to the Membership Secretary (address above) from whom further details can be obtained. (Remittances made in currencies other than Sterling are £5 extra to cover bank conversion charges.) Airmail postage for all journals is an extra £4, or for those not receiving the Fern Gazette £2.50. Standing Order forms are available from the Membership Secretary.

Front cover: Jimmy Dyce in the early 1970s.

Back numbers of the *Fern Gazette, Pteridologist* and *Bulletin* are available for purchase from P.J. Acock,13 Star Lane, St Mary Cray, Kent BR5 3LI, from whom further details can be obtained.

FROM THE EDITOR

This issue of the Pteridologist is dedicated to the memory of Jimmy Dyce. It is not a place for an obituary nor for biographical details for these have already appeared in other publications of our Society - the Society which meant so much to him. It is instead the place for remembering him through the accounts which are published here. Although the Pteridologist is not normally the place to publish new names it is particularly pleasing to include a new hybrid named in honour of Jimmy. New finds, distribution recording, fern growing and collections of ferns were all parts of Jimmy's interest, so it is good to have such a wide range of articles to bring to you in these pages. Nevertheless I hope I can be forgiven for slipping in a few bits and pieces about him and a few photographs. I also hope the articles will also spur others on to write for us all. Articles on all popular aspects of pteridology are welcome at any time of the year .

Jimmy on his 90th birthday.

MISSOURI BOTANICAL GARDEN LIBRARY SEP 15 1998

FROM THE PRESIDENT

All change. Unfortunately this year sees quite a few changes in Society officers. All positions are honorary and it is inevitable that members have to stand down for a variety of reasons. First of all I must express my thanks to Trevor Walker for his steady leadership over the last three years. Despite not owning a car he has attended every committee meeting except one at least three a year, not an inconsiderable inconvenience considering he lives in Newcastle and most meetings are in London or the south. His consistency has ensured good continuity between Committee meetings. Secondly I want to thank James Meryweather for his sterling work with the previous four issues of the *Pteridologist*. He brought the journal into the world of colour, greatly increasing its appeal over its drab predecessor!

As you might have noticed our new editor is Barry Thomas who has recently moved from the National Museum of Wales back into University. Barry is a paleobotanist with editorial skills, but he is not so much of a fern grower, I have therefore offered to help him out if he needs it! Barry was editor of the *Fern Gazette* together with Jim Crabbe and Mary Gibby. He has now relinquished that position and handed over to Josephine Camus who is ideally situated at the Natural History Museum in London to be aware of relevant research work worthy of publication in this prestigious journal.The spore exchange also has a new organiser, or rather organisers. Margaret Nimmo Smith has been incredibly successful with her management of the exchange, building on the solid foundations so well laid by Dick Cartwright before her. Her enthusiasm will be hard to replace, but I am sure Barry Wright and his wife will enjoy equal succes if you, the members, give them the support in terms of the spores they need. Spores don`t have to be from rare species, even ferns common to us in Britain are in demand overseas. We also have a new Membership Secretary, Alison Paul has combined this task with editing the *Bulletin*, but she has found an able successor in Michael Porter, enabling her to concentrate on the *Bulletin* and perhaps have a little spare time in future! While all these new appointments represent quite an upheaval there is one much bigger change to report. At the autumn 1998 AGM, after twenty years in the post, Matt Busby will stand down as Secretary. Matt is going to be a hard act to follow, he has brought such enthusiasm to the job and ensured that the Society thrived when it might have gone into decline after Jimmy Dyce`s resignation as Secretary 20 years ago. Over

these 20 years Matt met all the challenges the job threw at him especially during the run up to the centenary in 1991 when the workload must have been enormous. I know I speak for all members when I thank Matt on behalf of the Society for all his time and effort on our behalf. We are very fortunate to have Jennifer Ide as an ideal potential replacement for Matt. Jennifer has been on the Society committee for many years, she knows how the Society works and is vastly experienced having organised much of the Centenary Symposium in 1991. With all these changes at the moment I cannot resist a quick look back at past officers of the Society. Certainly there have been great men amongst our predecessors. For me to be elected as the new President when the likes of Dr Frederick Stansfield and Charles Druery have gone before is a daunting priviledge. It may interest newer members to know that at the turn of the century, in Stansfield's and Druery`s time, the BPS was a very'specialist Society catering solely for the fern grower, and primarily for the grower of cultivars at that. Exotic ferns were rarely discussed neither was the scientific side of ferns. This started to change with the election of A H G Alston as President from 1949 until 1958. Being based at the Natural History Museum in London, Alston knew what research was going on around the world and little by little members were made aware of it. Since Alston, almost without exception, Presidents have alternated between fern growers and scientists - this is not to say that scientists - are not fern growers too! The duration of any presidency has also been limited to three years. This policy ensures that the Society maintains its balance, we recognise the great contributions both disciplines can make to the future of pteridology and our society. Confining myself to Presidents who are now deceased four stand out in the post-Alston period on the scientific side Professors Eric Holttum and Irene Manton, and on the amateur, or horticultural side, Reginald Kaye and Jimmy Dyce. Jimmy Dyce is probably the single most important member of the Society this century, ranking with Stansfield and Druery. It has been said many times before but were it not for him the Society would have died out after World War II. I have been very fortunate to be able to count Jimmy as a very special friend for nearly thirty years and as he was my mentor, it gives me great pleasure to take over the Presidency at a time when we can celebrate Jimmy`s contributions to our knowledge of ferns and the well-being of the Society. Celebrate is the right word, Jimmy would not want us to mourn.This issue of the *Pteridologist* is the second dedicated to Jimmy. Fortunately he was around to enjoy the first on the occasion of his eightieth birthday in 1985. Then we published anecdotes about Jimmy plus a wide range of articles likely to have been of interest to him, even including one written by him! This time the formula is similar, and we like to think that Jimmy would have enjoyed it, unfortunately this time we have to manage without anything new written by Jimmy.This is not all we are doing to preserve Jimmy`s memory. A more exciting project is the publication of his book on cultivars of *Polystichum setiferum*. This was written by Jimmy a few years back but its publication was delayed by the lack of illustrations. I hope that this can be overcome this summer and the book published as soon as possible after that, as BPS Special Publication No 6 or 7. There are other special publications in the pipeline which might be issued before Jimmy`s book. The Society will be doing more to perpetuate Jimmy`s memory, already in production are cut glass glasses engraved with the Society logo and Jimmy`s name. These will be ideal for the odd wee dram! Also very exciting is the future Meetings programme. The domestic and regional programmes are as interesting as usual but most exciting is the prospect of a meeting in New Zealand in 2000 or 2001, how Jimmy would have loved that! It doesn`t end there. Other overseas meetings are also being considered, including a possible excursion to see our friends in the Hardy Fern Foundation and American Fern Society in Seattle. Sue Olsen from Seattle has already sent me a mouth watering itinerary! If the New Zealand meeting is a success it is hard to see any limit on where we might plan an excursion in future! We have other plans, some may not come off, but despite all the changes amongst the Society officers the Society is in very good heart and we look forward to the millenium with great enthusiasm.

JIMMY DYCE - "in person".

Betty Dyce

Members of the British Pteridological Society will always associate the name of Jimmy Dyce with "Ferns" and I wonder if they would like to know how he became interested in the subject and indeed how he became involved with the Society.

Born in Peterhead, Aberdeenshire, it was not long before the family moved to Aberlour where Father took over the running of the Estate of what they lovingly called "the Big Hoose". School was 3 miles away and, no matter what the weather, Jimmy had to walk there and back, so no doubt he had ample opportunity to study nature. Father was interested in ferns, so it was not difficult for him to pass on this interest to his son because "James" had always been very botanically minded.

Father and Mother decided that their son should have a "good" job and put him into the Bank of Scotland in Aberlour where he successfully passed all the necessary examinations. It was whilst reading one of the Bank's magazines that he saw an advertisement for recruits for the Chartered Bank of India, Australia and China, and this whetted his appetite for a chance to be sent to any of these countries where he could pursue his botanical interest. However the move to London with all its "glamour" became fascinating and he never did get to any of these three Countries, at least not via the Bank.

Whilst we met in 1944, we were not able to marry until 1949, so you will appreciate that my story comes from my memory, almost 50 years on, but I believe Jimmy became a member of the then rather run down B.P.S fairly soon after arriving in London (1935) and formed a deep and lasting friendship with Percy Greenfield - a great guy and standing out in my memory one with huge moustache and wearing knickerbockers, a true country gentleman looked after by a live-in housekeeper. I think it was Percy and Dr Stansfield who saw a potential leader a young Dyce. as Percy would call him, and he agreed to take on the job of B.P.S Secretary (1939), so, when I came on the scene he was well and truly involved, and being a Secretary, I came in handy for all the typing that ensued - no computers then, but a portable Olivetti with individually typed envelopes until rolls of labels made the job easier and quicker. Not only did he do the secretarial work, but created a Book Sales "department" (late 1960s) which helped with the finances of the Society to which he was dedicated.

I have said earlier that he did not get to either India, Australia or China through the Bank, but he did get to India by courtesy of the Royal Air Force for which he volunteered and of course he was in his glory and took up two more hobbies, Entomology and photography, in addition to his botanical pursuits. He was able to explore the country, going on a trek to kanchunjunga being one of the highlights. In normal circumstances he would have stayed there until demobbed, but a motor accident whilst being transported from one area to another resulted in a burst spleen which was just discovered in time to prevent his death. He spent many weeks in hospital and was eventually invalided out, and back in the U.K., so life in the Bank began again. However, Banking was not really his cup of tea, and the sooner he could get back home and into shorts and in the garden, the better he liked it and the house at Loughton proved ideal, with its own right of way into Epping Forest.

Jimmy retired at the age of 62 on health grounds, having suffered a rather bad nervous breakdown, but it was the opening to further his already great interest in ferns, as he was now free to go on all the excursions all over the country with other like minded members of B.P.S. He formed a great fiiendship with Reginald Kaye - another great guy, with such humour and whose company was much enjoyed after the evening dinner, especially with a wee dram (or two) in the hand.

Jimmy loved food, and always enjoyed any meal put before him, and another hobby was created - cooking, dishing up the most exciting concoctions helped along with the Good Food Magazine. Good Food needs wine, so the next hobby was home wine making, and once he got his teeth into something, he did it thoroughly, and became a lecturer and Founder of several Wine Circles. One could say that life began for him at retirement, and he was able to spend most of the 30 years enjoying those numerous hobbies, and I haven't mentioned all of them!

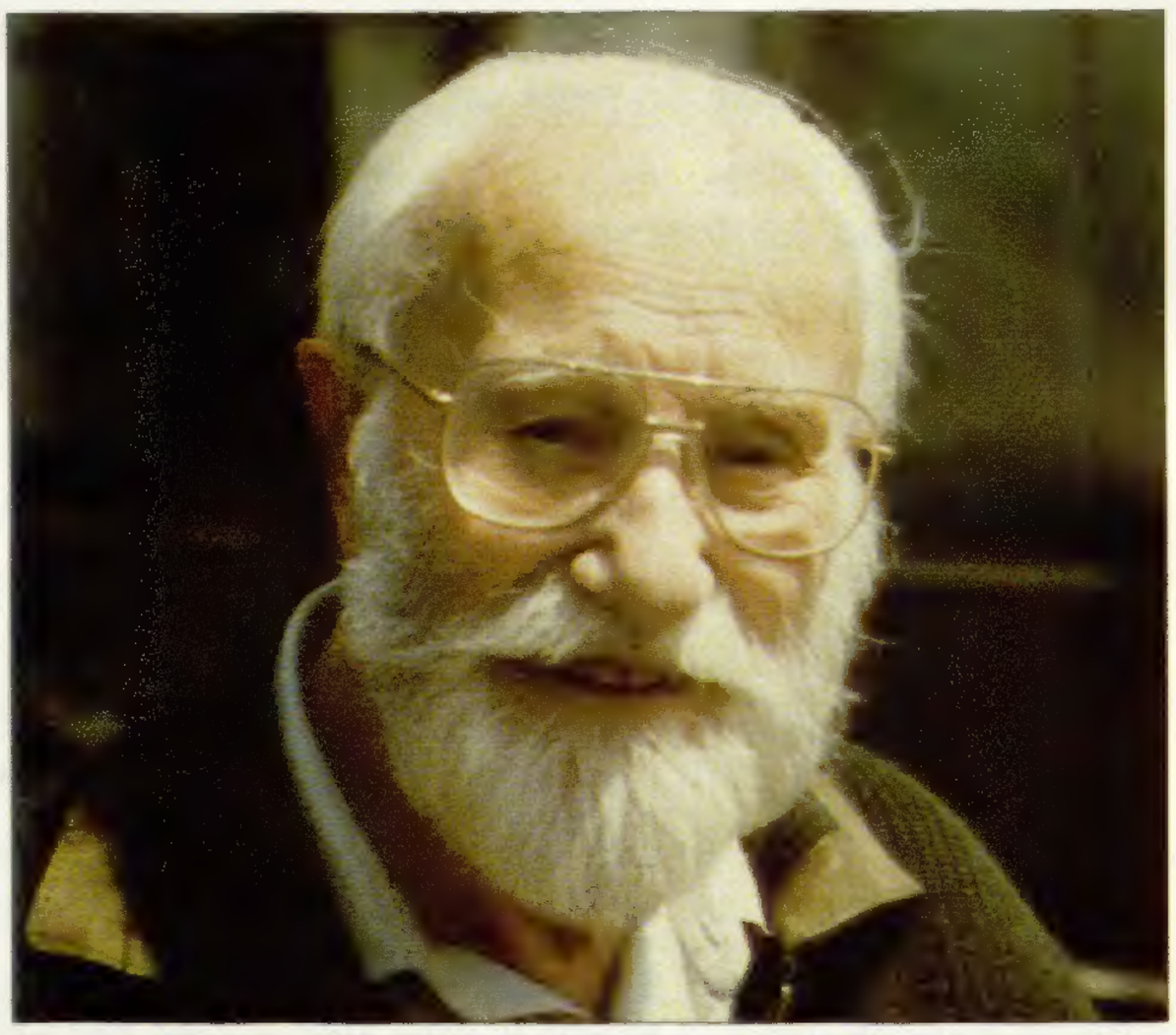
I think the rest is history, with his various articles in the B.P.S. Bulletin, the books he wrote and the meetings he attended, which have all, I think, been recorded in the Bulletin.

EQUISETUM X DYCEI AND ALL THAT

Chris Page, Gillywood Cottage, Trebost lane, Stithians, Truro, Cornwall TR3 7DW.

It was throughout the early and late seventies that I spent many happy days in the field with Jimmy Dyce on his annual visits to Scotland to see his elderly mother. Jimmy found, I think, in me, an enthusiastic recruit whom he could educate simultaneously in the two main driving forces of his life: ferns and malt whisky. Women also played a third force somewhere, although I never really fathomed where. He did, however, at times, pride himself as running the B.P.S.'s unofficial marriage bureau.

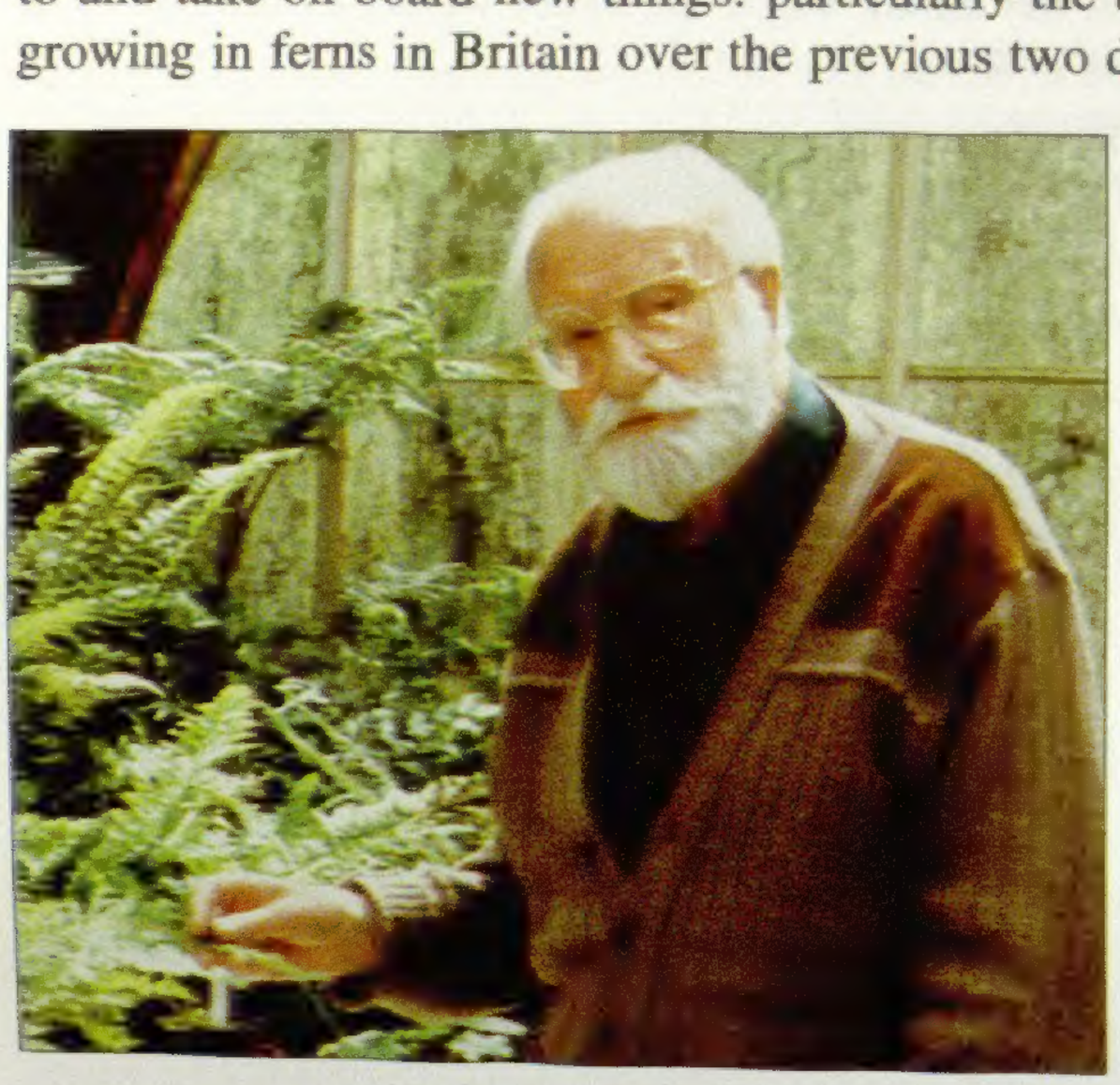
On each of his summer's visits to Scotland, we organised to meet up in what turned out to be often increasingly remote corners, for a week or so of what Jimmy always referred to as fern hunting. Sometimes others joined us, but mostly we were by ourselves. He liked, for some reason, to travel in the back of my ancient Landrover, probably because of its high vantage point and commanding view over the hedges. From the driver's point of view, you gained a running commentary from behind on what he spotted outside that looked interesting, interspersed, of course, with the usual complains about everything, which, in less ferny areas, was the main way that you could tell if he was still with you.



Jimmy Dyce at the centenary meeting at Kew

Britain, and British Pteridology, had been, for a long time slowly regaining all those aspects of life that had made Britain British in the earlier part of this century and for much of the previous one. Following the war years, and the shortages and mundane austerity that for so-long followed, I realised that through these years Jimmy, almost single-handedly, had kept the British Pteridological Society alive. He always dreamed of it becoming an international force for pteridology again.

By the time I came to know him in the early seventies, Jimmy had firmly re-established fern-growing as the B.P.S.'s. main core. But what so impressed me was that he was also farseeing enough in what was already the beginning of his elderly years, of being able to adapt to and take-on-board new things: particularly the burgeoning scientific interest that had been growing in ferns in Britain over the previous two decades. Thus although I knew him initially in his fern-growing guise, I became increasingly impressed with his British field knowledge, and his ready acceptance of a young but determined whipper-snapper like me, whose main interests were frmly in this area, to whom he could pass on some of this. He had already achieved a lot of pteridophyte recording, and very many of the dots in the Fern Atlas were probably his.



Jimmy Dyce in Cornwall

I became particularly impressed with Jimmy's field knowledge because it was an intimate knowledge borne exclusively out of first-hand experience, and I came to greatly respect him for this and his dedication. Indeed, as I got to know the Scottish ferns too, we had much jovial

competition as the years went by, usually as we approached a new promising-looking fern habitat unknown to either of us, about exactly what ferns we would expect to find growing there. Indeed, even in those early days, he and I had sorted out that we had at least three different Golden-scaled Male-ferns in Scotland, long before, as far as we knew, anyone else was interested. Our banter and fiiendly competition, bordering at times on ribald rivalry, became a remarkably accurate species-forcasting technique, and kept us both thinking.

I missed these occasions when, in the progress of things, Jimmy's mother eventually died, and Jimmy himself found the long trip to Scotland each year becoming too much for him. There was still chance to renew old rivalries again when I travelled south to Join B.P.S. meetings, where we again met up. It was only then that I found that I had also had some influence on Jimmy, for he had taken on yet a further new aspect in old age - what I had been able to show him about *Equisetum* and its hybrids - and he was now relating this at meetings to others.

Well, Jimmy got his wish. The B.P.S. is again an important international force in pteridology. It was a great honour to me to be able to name a horsetail, *Equisetum x dycei* C.N.Page, after him. I'm sorry, Jimmy, that it turned out to be a sterile hybrid, but this does not retract from its taxonomic value. I pointed out to Jimmy that at least it had a distribution which almost exactly corresponded to that of the best Malt Whisky distilleries. Jimmy was honoured, and approved.

FERN RECORDING AND MONITORING: A PROGRAMME TO TAKE THE BPS INTO THE NEXT CENTURY

A. C. Jermy, Botany Department, the Natural History Museum, London SW7 5BD

INTRODUCTION

If anyone was keen to get into the field and hunt for 'fearans' it was Jimmy Dyce! Although his banking career kept him office-bound he was extremely fit, and I have know several occasions when within 24 hours of leaving his desk he would be enjoying such activities as climbing the Crib Goch Ridge - ahead of everyone else! It was Jimmy who devised a Recording Card for the Society to use on its field trips; and it was he who laboriously went through the first edition of the *Atlas of the British Flora* (Perring & Walters 1962) seeing how many new 10km-square records we had made on our most recent excursion. As he came on every BPS excursion for some 25 years, his copy of that book will show many red dots added as a result. It was he who encouraged publishing an Atlas of pteridophytes only and that which appeared in 1978 (Jermy *et al.*) was the result of a BPS network activity. We were able to have the output from the computer of the Biological Records Centre at Monks Wood to produce maps (at that time less sophisticated than it is today) but PCs and the programmes to manipulate amassed records were not available. Now we are contemplating our own BPS electronic databases, with the full co-operation of BRC, and we no longer need to keep records by adding red dots to earlier publications!

The theme of this article is not to discuss databasing, however; there are others in and out of the Society who can do that much better than I. Instead, I want mention a few ways as to how our members, whether professional botanist or 'hobbyist', can contribute towards recording and monitoring some of our more interesting ferns (and 'allies'). In most cases it means working with others – BSBI Recorders, members of local Wildlife Trusts, with Conservation Officers of the Government conservation agencies (English Nature, Countryside Council for Wales, and the Scottish Natural Heritage, or in Northern Ireland with the Department of the Environment (NI); and in the Republic of Ireland, with the Department of Arts, Culture and the Gaeltacht). Data initially will be deposited in BRC (or its equivalent in Ireland) and contribute to the publication of *Atlas 2000,* the large-scale BSBI network project in train at the moment.

OUR CHANGING PTERIDOPHYTE FLORA

Taxonomic knowledge and concepts

One might think that after some 200 years of active botanising the flora of these islands is well known. True, but over the years, as we learn more about the variation, genetics and ecology of

a species we see that variation in a new light. Josephine Camus (1991) reviewed changes in our British List and still things change. Edward Newman was first to describe an alpine form of *Lastrea* (=*Dryopteris*) *dilatata* from Ben Lawers, a plant we know today as *Dryopteris expansa,* after Stanley Walker (1955) had shown it had a different chromosome number from, and is one of the parents of *D. dilatata*. About the same time, Jimmy Dyce was recording an unusual stoloniferous form of *D. dilatata* in his native Aberdeenshire, now known to be also *D. expansa.* New records of this species can still be made from high mountains down to sea-level. Martin Rickard, always with an eye for something unusual, found *Asplenium trichomanes* subsp. *pachyrachis* new to Britain in the Wye valley (Rickard 1989). The Victorian fern collectors had also found this 'variety' as Martin was fully aware. As part of a world-wide survey, the *A. trichomanes* complex is now being scrutinised using DNA and other molecular techniques by Johannes Vogel and his team at the Natural History Museum, and we hope that the maps of the taxa recognised will be substantially revised. For identification of this and other *Asplenium* subspecies see Jermy, Rumsey &Vogel in the BPS/BSBI *Plant Crib 1998* (Rich & Jermy 1998) and the references therein. Subsp. *pachyrachis,* a rare taxon in Britain, is reasonably distinct (see Fig. 1) and should be looked for on castle and ruined walls or on natural rock walls containing some lime. Vogel has also studied in detail the complex of *A. adiantum-nigrum*, including the serpentine-loving form (called incorrectly in the *Atlas, A. cuneifolium*). He recommends (pers. comm.) it be recorded as a subspecies for which the oldest, and thus correct name, appears to be *silesiacum*, although Page (1997) refers to it by a later name, subsp. *corrunense.*

Another complex species is the bracken. *Pteridium* is a cosmopolitan genus of possibly six species but certainly many genetical forms. Not everywhere is it the invasive weed we see in western Europe. One variety, now treated by Chris Page as a species is *P. pinetorum*, a distinct plant of finite growth and low stature associated with ancient pine forests in Scotland and N. Europe generally (see Page in the *Plant Crib 1998*: p. 19-20).

A complex that is by no means clear is *Cystopteris fragilis* agg. and older books had several varieties. The rugose spore variant and characteristic garden form *C. dickieana* is morphologically distinct, and is so rare in the wild as to have legal protection. There are rugose-spored forms, however, that are identical in all other respects to *C. fragilis* (Tennant 1996) and should be looked for in shady limestone gorges. The very finely dissected form, *C. alpina* (*C. regia* of earlier books) may yet be found on limestone at higher altitudes, e.g. Skye.

Two other 'allied' species that could be mentioned are the fir clubmoss and the variegated horsetail. *Huperzia selago* has a form, subsp. *arcticum,* with smaller yellowish leaves which is now considered a possible element of wind-swept mountain summits in Scotland and is describe and figured in the *Plant Crib 1998,* p. 4. *Equisetum variegatum,* in contrast, shows great ecological variation from high-level ledges in Scottish mountains to coastal sand-dune slacks in the south of England. Populations at Braunton Burrows (and possibly elsewhere) shows morphological variation which still needs further investigation (Crabbe *et al.* 1965).

Dryopteris affinis complex is difficult to identify to varietal or morpphotype level and there is no space to discuss the problem here. The reader is referred to the *Plant Crib 1998,* p. 29-33, where a full explanation is given. In all cases voucher specimens should be collected and preferably sent fresh by first-class post to Anthony Pigott, Kersey's Farm Mendlesham, Stowmarket, Suffolk IP14 5RB.

In this brief overview of recording our pteridophyte flora we should not forget the detailed picture that is now emerging of the appearance of the gametophyte phase of the Killarney fern, *Trichomanes speciosum*. The species is protected under laws in Britain, Northern Ireland and the Irish Republic, and throughout in Europe (i.e. its world range) although when its 'independent' gametophyte is included, it is by no means a rare organism. A 10-km map showing the present known spread of the gametophyte in the British Isles is given in *Watsonia* (Rumsey *et al.* 1998) but many more records may yet be made as people get their eye in for this filamentous prothallus (see figures in *Plant Crib 1998** and Rumsey & Sheffield, 1990). Fred Rumsey will continue to monitor the spread.

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* Copies of the fern part of the *Plant Crib 1998* published in association with the BSBI have been made available to the BPS and can be obtained from Steve Munyard in return for an **A4** s.a.e with two first class stamps.

Figure 1. *Asplenium trichomanes* subsp. *pachyrachis* on Caldicott Castle, Feb. 1997. *Phot. J.C. Vogel.*

Endangered Species

A number of our ferns are 'endangered', that is they are threatened by some situation, usually man-made such as change of land-use or collection for horticulture. These, together with the flowering plants have been published, in what is now an internationally accepted convention, a Red Data Book (Cooke 1996). That for the Britain is now in its third edition (Wigginton in press) which is expected this year and the species listed therein were given by Cooke (*l.c.*) and are included in Table 1 here. A similar RDB has been produced for Ireland (Curtis & McGough 1988) and the pteridophytes included there are also shown in Table 1. In Britain, Northern Ireland and the Republic of Ireland those species in the highest categories of threat are protected under various laws. In all cases it is an offence to damage, remove or be in possession of the protected species. Furthermore, laws of the European Union which the UK must act upon, also apply to habitat and species protection.

The loss of diversity of both plants and animals is, or should be , in every body's mind. The meeting of the world governments in Rio de Janeiro in 1992 to discuss the situation stimulated action. One major result of which was the *Convention of Biological Diversity* which some 174 States have now signed up to) It also generated some funds at both local, national and international levels to carry out relevant action. The UK government set up a Biodiversity Steering Group which has published a volume of Action Plans (Anon. 1995). This document gives a 'short list' and a 'long list' of globally threatened/declining species. The ferns included there are shown in Table 1. All three conservation Agencies: Countryside Council for Wales, English Nature, Scottish Natural Heritage have included a number a species in their Action Plans and between them have found some funding to research, take action and, hopefully, monitor their successes to conserve plants on these lists. As far as ferns are concerned, *Lycopodiella inundatum, Pilularia globulifera, Trichomanes speciosum* and the two *Woodsia* species, have already received attention.

BPS NETWORK ACTIVITIES

The following lines of activity could be considered:

1. Recording all pteridophytes in selected 10km squares around one's home area.

The BSBI project, *Atlas 2000*, and subsequently the revised *Fern Atlas,* will record presence in revised date classes (pre-1970, Jan. 71–Dec. 86, and 1987 onwards) and what had been shown as a solid dot (post-1960 record in the *Fern Atlas*) may not appear thus is the newer editions. So a very useful exercise can be to take a number of 10km squares and see how the present flora,

as far as you can survey it, compares with those records in the *Atlas* of 1978. It is worth checking if any local group is already working on a wider remit for *Atlas* 2000 or a local Flora. Several members are working very hard to update fern records, e.g. Barbara Porter and her group near Stockport. John Durkin has done similar work but at a county level in Durham. Others are collecting records on a finer grid basis (at the 'tetrad', i.e. 2 (2km level) for an Atlas of a whole county or vice-county. An excellent example of this is the group in Cornwall, with BPS members Rose Murphy (also currently the BSBI Recorder for E. Cornwall) and Ian Bennallick, who, using a computer programme designed by Colin French, are mapping the flora at this tetrad level. They have kindly allowed me to publish here (Fig. 2) a draft tetrad map showing *Dryopteris aemula,* and for comparison, the 1978 map showing the coarser 10km squares. Clearly the finer distribution pattern tells us much more about the ecology of *D. aemula* when interpreted by those that know the area.

Almost every village in lowland England will have suitable habitats for characteristic wall ferns – the church and complex tombs, walls around the churchyard and around the older houses e.g. the manse and 'the big house'. Surely *Asplenium ruta-muraria,* and possibly *A. adiantum-nigrum* can be found in each 10km map-square? And what clumps of *A. trichomanes* subsp. *quadrivalens* and even *A. ceterach* are lurking on those SW facing walls? Two excellent articles on this topic were those of Ron Payne (1993; 1998). On dry-stone walls of non-calcareous rocks *Polypodium spp.* may be present and, when stunted, can be teasers to identify. If the wall has a mortar capping, *Polypodium interjectum, P. vulgare,* and the hybrid *P.* x *mantoniae,* may all be present.

2. Checking out on old records

Searching for species that have not been seen in particular sites for some time is a very profitable exercise. The *Fern Atlas* (1978)shows an open circle for records before 1960. Those included in Stewart *et al.*(1994) (see Table 2) are so marked for pre-1970 records. It would be useful to know if a habitat in which an early record had been found is entirely destroyed or changed in such a way that the species could no longer be expected there, for instance. It is surprising, however, how many old records can be re-found when looked for by somebody who knows the niche of the plant. All counties will have early records in published form and the local library is the best place to start. Also voucher material may exist in local museum collections. If anyone is having problems over finding literature or would like to hear if there are ferns to re-find in their area please contact me.

3. Filling the gaps and assessing present status

When we look at the *Atlas* or a county flora with appropriate maps we often see a relatively common species rare over a large area for no obvious reason. For instance, why is *Polystichum aculeatum* absent from most of Cornwall. Partly due to lack of alkaline rocks but there are bridges in shady valleys which, if in Scotland, would have the plant in abundance. What we do know is that the county has been well covered by expert pteridologists (see above), so the absence is not due to lack of recording. But we should think *why* this absence occurs. Can the species be grown in gardens in the area with success? And in some cases the gaps may not be real. Use your experience of knowing where a species is likely to grow and, if the habitat is available, see if it is there.

* This refers to the level of threat at the Country indicated; based on IUCN criteria (Stuart & Mace 1994[iii]): **CD** Conservation Dependent; **CR** Critically Endangered; **EN** Endangered; **EW** Extinct in the wild; **VU** Vulnerable; **LR**-Low Risk.

† Protected in Britain under Schedule 8 of the Wildlife and Countryside Act 1981; or in Irish Republic under the Flora Protection Order 1987; or under the Wildlife (NI) Order 1985.

■ Included in edn 3 British *RDB* (Wigginton in press). ♦ Included in *Scarce Species* (Stewart *et al.*1994)

UK Biodiversity Strategy (Anon 1995) *Short List..* UK Biodiversity Strategy (Anon 1995) *Long List.*

▲ Included in the Irish *RDB* (Curtis & McGough 1988). np. Not present. n.t. Not threatened.

TABLE 1 Species protected by national laws **or** considered in a special conservation categor (Red Data Lists or Action Plans etc.) with Country and International threat status.

Species	Britain	Northern Ireland	Irish Republic	Status at world level *
Adiantum capillus-veneris	◆ VU	EW	VU	n.t.
Asplenium obovatum subsp. *lanceolatum* (syn. *A. billotii*)	◆ n.t.		▲† VU	LR
Asplenium septentrionale	◆ VU/EN	introduced	▲† VU	n.t.
Asplenium trichomanes subsp. *pachyrachis*	■ VU			n.t.
A. distentifolium	◆ n.t.			n.t.
Athyrium flexile (syn. *A. distentifolium* var. *flexile*)	■ # VU			VU
Cryptogamma crispa	nt	VU	▲† VU	n.t.
Cystopteris dickieana	■ † EN			n.t.
Cystopteris montana	◆ n.t.			n.t.
Dryopteris cristata	■ VU			LR
Dryopteris submontana	◆ n.t.			n.t.
Equisetum pratense	◆ nt	▲† VU	▲ VU	n.t.
Equisteum ramosissimum	■ † VU			n.t.
Gymnocarpium dryopteris	n.t.	▲† CR	▲ VU	n.t.
Gymnocarpium robertianum	◆ n.t.		▲† CR	n.t.
Isoetes echinospora	◆ n.t.	n.t.	n.t.	n.t.
Isoetes histrix	■ † VU/LR			LR
Lycopodiella inundata (syn. *Lepidotis inundata; Lycopodium inundatum*)	◆ VU	▲† VU	▲†VU	VU
Ophioglossum azoricum	◆ n.t.		n.t.	n.t.
Ophioglossum lusitanicum	■ † EN			LR
Pilularia globulifera	◆VU	▲† VU	▲† VU	LR
Polystichum lonchitis	nt	▲† VU	▲ LR	n.t.
Thelypteris palustris	◆ VU	VU	VU	n.t.
Trichomanes speciosum	■ † VU	▲† VU	▲† VU	VU
Woodsia ilvensis	■ † # CR			n.t.
Woodsia alpina	■ † VU			n.t.

* This refers to the level of threat at the Country indicated; based on IUCN criteria (Stuart & Mace 1994[iii]):

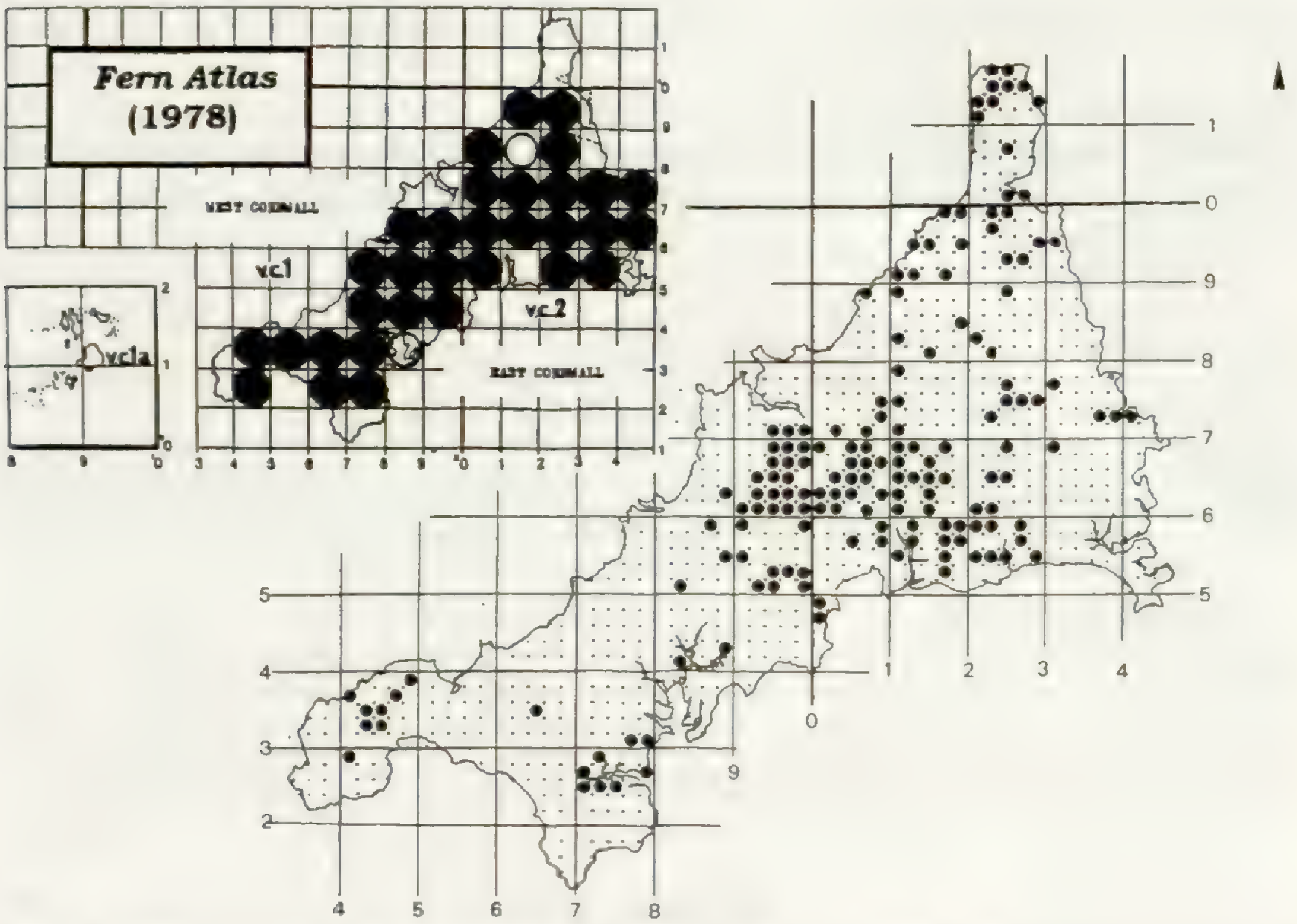

Figure 2. Draft distribution of *Dryopteris aemula* in Cornwall. An example from the Erica database being used for *Atlas of the Cornish Flora* project (with permission of Colin French *et al.*).

4. Looking for hybrids

Looking for hybrids in populations of mixed related species is fun. Get your eye in for the two parents and then see if intermediates occur. Then check the spores (obviously this must be done at the right time of the season) to see if they are aborted. Hybrid spores usually show a variation in sizes from those typical of the fertile species (25-45mm) to some very much smaller than the norm, irregularly shaped, usually with no or little cellular content.

Page (1997) gives full descriptions of all pteridophyte hybrids and Hutchinson & Thomas (1996) gives diagnostic characters of most, including some not yet recorded for, but likely in, the British Isles. The *Plant Crib 1998* (Rich & Jermy 1998) gives additional illustrations, and characters in table form of some of the more common *Asplenium*, *Equisetum* and *Polystichum* hybrids.

5. Mapping locally rare species

Mapping the rarer species in a particular protected area (e.g. Local or National Nature Reserve, or a selected area of a national Park) can be both satisfying and useful. It must be done in conjunction with local wardens or other managers as you may find somebody has already started the project and laid a foundation on which you can build. In such cases you will have to use the same methods and, if posible, concepts of species. If you know the species well you may be able to help the Warden by giving advice on how the rarer species should be managed in order to conserve it.

6. Studying the nationally Scarce Species

Fourteen species of pteridophyte are mapped and appraised briefly in the *Scarce Plants in Britain* (Stewart *et al.*1994). All of these present exciting subjects for study. Some such as *Pilularia* and *Lycopodiella inundatum* are already subjects of English Nature 'Recovery' programmes (Rob Cooke, pers. comm.), or Scottish Natural Heritage Action Plans (Sue Scott and Phil Lusby, pers. comm.). These species are declining due to habitat loss. *Pilularia* is an opportunist plant colonising the bare clay of dissused brick-pits or similar alluvial areas which, unless managed, scrub over and get built upon. However, the presence of the plant in deep water

in some Scottish and Welsh lakes is difficult to explain and we should look out for it in these situations.

Species in mountain habitats, on the other hand, such as *Cystopteris montana* and *Athyrium distentifolium* are not really threatened but many of the records are old ones that need re-finding. A species like the *Cystopteris* is best searched for with a geological map on which you can locate small outcrops of calcium-bearing rocks. I am sure for both species there are more sites to be found in the remoter parts of Scotland. Likewise *Lycopodium annotinum* is probably more widespread in the Grampians than the present records show. *Asplenium septentrionale* is recorded in 27 10km squares but within those squares only in 31 tetrads (Stewart *et al.* 1994); it has been 'lost' from 24 10km sqs. In the British Isles this species may be 'Endangered'.

In other species such as *Thelypteris palustris*, the challenge is checking old sites and seeing if remnant populations still exist. With *Isoetes echinospora* a diligent search around lake shores may reveal washed-up fertile leaves with megaspores (see Rich & Jermy 1998, and Stace 1997 for illustrations of the megaspores). It is unusual to find both this species and *I. lacustris* in the same lake but as lake chemistry changes, echinospora may spread. The two species do hybridise (see *Plant Crib 1998*).

RECORDING THE DATA

If at any time you feel uncertain about the identity of any species or hybrid you are recording, take a small piece of the plant (unless you suspect it being a protected species when a photograph is best) as a voucher for later confirmation. The specimen should show at least some pieces of leaf with sori and mature spores. Dry this whilst still fresh by pressing it between newspaper or other absorbent paper. Vouchers of all suspected hybrids should be taken as should any specimens of *Dryopteris affinis* as we hope to map the variation seen in this difficult group (see above).

If you are recording for another organisation it is best to use their data-forms if they have them. As the BPS is working closely with the Botanical Society of the British Isles in proving the BRC with data for *Atlas 2000* we ensure all our records are seen by the BSBI Vice-county Recorders. If you are active in recording you should contact your local Recorder and I can give the names and addresses of any needed although they should be well known in county natural history circles. Individual records of unusual species should be put on BRC 'Pink Cards' (available from the Recorder or from me). For recording pteridophytes on a site basis our BPS cards are the most convenient. When giving National Grid references always give the full eight figures unless you are dealing with a very rare species when, for security reasons, it may be advisable to be less precise. Always keep full details yourself for future reference.

Atlas 2000 will be published showing mapped records at the 10km square (heptad) level as the *Fern Atlas* of 1978 does. The proposed revised *Fern Atlas*, using the same data from BRC, supplemented by input from regional surveys and individual specialists, will contain maps of varying scales to illustrate the distribution in relation to ecological factors, etc. At the county level, most recent Floras have been mapped or at least published at the tetrad level (squares 2 x 2km) (e.g. Floras of Cumbria, Devon, Kent, S.E. Yorks, to mention just a few. The next stage in fern mapping will be to relate such records at the site level to other parameters already mapped and stored in the computers in a Geographical Information System programme and the BPS is already talking to institutes using those techniques.

ACKNOWLEDGEMENTS

I would like to thanks Rose Muphy, Ian Bennallick and Colin French for allowing me to reproduce Figure 2, Johannes Vogel for the use of his photograph of *Asplenium trichomanes* subsp. *pachyrachis*, and Alison Paul and Fred Rumsey for comments on early drafts.

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Four Corners of Britain Challenge

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On holiday, in the Lizard, this year I was informed that I was to take the girls to Lands End instead of looking at stone circles with the rest of the party. On remembering seeing *Osmunda regalis* on the cliffs on a preview visit, my initial disgruntlement changed to an air of expectation. Above the cliffs I suddenly wondered what the most westerly plant in Great Britain might be. Within a tenth of a second I had lost interest I wanted to know what the most westerly fern was. Scrambling towards the edge of the British mainland with my friend's daughter Emma terrified, a few paces behind, I realised that the challenge to name the fern most northerly, southerly, westerly and easterly, would have to be restricted to the mainland of Britain. The reason being that pteridologists are few in number and it would be easy to loose them on this foolish quest especially if they took to the water.

It was, more hazardous than I expected but, to my great joy, the most westerly fern I could find was *Asplenium marinum*. Having been joined by my friend and terrified daughter two, a picture was duly taken of this quite large specimen several feet back from the cliff edge. I explained the challenge to the group hoping that we might lay a tentative claim to three points of the compass before a week elapsed.

Unfortunately on returning back to base it appears that Ramsgate is nowhere near as far East as a place just South of Lowestoft. Undaunted next day I went out to fmd the most southerly fern. This proved to be even more hazardous than the previous venture for the cliffs are a lot steeper. To start with it looked like bracken was to be the victor but after much searching a diminutive desicated specimen, much exposed to fight and the elements, of *Asplenium marinum* claimed the prize again.This plant was a long way back from the southern most point on a driveway down to a small jetty opposite the shell of an old boathouse.

Perhaps others would like to find the most northerly and easterly plant in Britain but I would like to open the challenge to all our readers. I for one would like to know which ferns occupy these positions in other comers of the world. I do hope to hear from you but do be careful!

EXCEPTIONALLY LARGE *ASPLENIUN MARINUM* ON RATHLIN ISLAND, COUNTY ANTRIM

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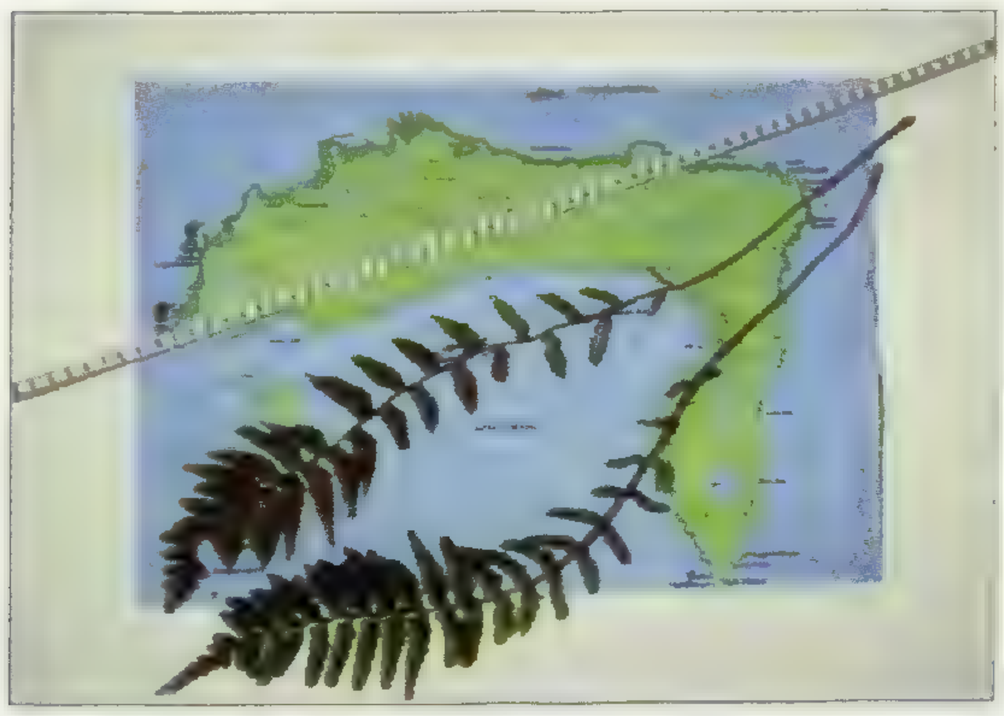
It was Adrian Dyer's article on *Asplenium marinum* in Iona Abbey (Pteridologist 3, ???, 1996) and the relevant data on the sizes of its fronds that made me realise, with some exhilaration, that the group plants I found flourishing in deep crevices on the west facing back wall of a cave at Couoraghy bay were indeed exceptional. Given the remote location of the cave, the excitement was not wholly due to the fronds measuring 55 cm in length, but to the possibility that I was the first person to see them. The cave was at the foot of a limestone cliff about 30 ft above sea level, in a shallow bay on a small J-shaped volcanic island (5 miles by 3 miles) sitting in the middle of the North Channel of the Straits of Moyle, County Antrim (Lat. 55°3′ North, Long. 6°2′ West).

The plants were growing in a seepage crack on the back wall where there was reflected light and the microclimate was surprisingly warm and humid. This location, together with the insulate orientation of the site, gives it an excellent oceanic climate where it receives warm moisture-laden prevailing winds off the North Atlantic drift which clearly provide the ambience necessary for maximum growth.

Not having any hybrids, the only variation of *Asplenium marinum* appears to be the *elongation of all its parts*. The fronds were up to 55cm in length and the pinnae were much elongated, up to 54mm, and tapered almost to a point.

There are sizes quoted in the literature of 18" - (46cm) in dripping caves (Francis G. Heath *Fern Paradise*, 1880, p.429) and one or two feet or even more - 46cm (30-60cm) or more (J.E.Soweby *Ferns of Great Britain*, 1885, p.51). James Britten in his *European Ferns* (p.99) state "The other extreme in size is also recorded by the author just quoted [Newman] who mentions specimens in Guernsey having fronds two feet or even thirty inches long" and on page 100 quoting from Moore "The largest form of the species is the Channel Islands plant called *Parallelum*, the fronds of which are as much as three feet long with long narrow and very distant pinnae). The largest frond reproduced in Moore and lLindley's *Nature Printed Ferns* is 18" - (46cm) long.

I raise the question and seriously float the idea that the ferns on Rathlin Island are the longest found this century.



DICKSONIA ANTARCTICA IN TASMANIA. SOME BACKGROUND TO THE ARGUMENTS FOR AND AGAINST LARGE-SCALE HARVESTING FROM THE WILD

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Dicksonia antarctica is native to the eastern Australian States of Tasmania, Victoria, New South Wales and Queensland. It is an important and conspicuous component of wet forests in Tasmania, but is just as common in sheltered gullies in areas of lower rainfall (Figure 1,2). Because of its preference for moist sites, it is more common in Tasmania than in other Australian States. The species is abundant and widespread and is well protected within numerous National parks, forest reserves and State reserves in Tasmania (Garrett 1996). The most recent estimate of the number of *D. antarctica* plants occurring on all land tenures in Tasmania is in the vicinity of 120 million (Forestry Commission 1989).

Dicksonia antarctica is the most easily recognised fern to most Tasmanians and is known colloquially as 'manfern'. This common name is now occasionally used on mainland Australia, but it has its origins in Tasmania. Bracken fern (*Pteridium esculentum*) is perhaps the only other native fern species that is just as well known to average Tasmanians, but as this species is such an invasive and vigorous grower, more often than not it is presumed to be an introduced weed. The common name 'manfern' also leads to the incorrect assumption that there is a 'lady fern' and that cross-fertilisation is required between the two.

As well as being a seed bed for other forest plants, *Dicksonia antarctica* is an important host for some other fern species. Its fibrous trunk is the principal substrate, or one of several principal substrates, for twelve epiphytic fern species (particularly filmy ferns) in Tasmania. In addition, its trunk is a minor host to a further four epiphytic fern species, and 15 usually terrestrial fern species (including *D. antarctica* itself) have been occasionally observed growing from it. None of the above species is rare, endangered or restricted in its distribution.

Dicksonia antarctica would appear to be remarkably stable in its macro-characteristics throughout its range in Tasmania. The only variant I have seen (and only on a few occasions) is a form with a single trunk topped with hundreds of small crowns. In all cases the plants have been infertile. Multi-trunked plants with several crowns are not uncommon, but are formed as a result of several sporelings having grown in such close proximity that their trunks have fused with age.

Dicksonia antarctica is widely grown in Tasmanian gardens. There are no official statistics, but I would estimate that the number of gardens containing at least one plant of the species may be as great as one in every four. These plants have either been gathered from the bush by the householder or purchased from a nursery or other outlet. In nearly all cases they are trunked plants that have been sawn off at the base. Occasionally, trunkless plants of an equally abundant species, *Polystichum proliferum*, are removed from the wild and replanted under the misconception that they are young manferns. These plants nowhere near reach the proportions of *D. antarctica*, and may then be regarded by some home gardeners as the manfern's elusive better-half or 'lady fern'. Due to its mistaken identity, *P. proliferum* then becomes the second most widely planted fern in Tasmanian gardens.

For successful cultivation in Tasmania, *D. antarctica* requires a position out of strong sun and wind but with an ample supply of moisture. The choice of substrate would seem to be of little concern. Years ago I rescued from the bush a 2 m tall trunk that had been felled and left to die. Having no immediate place to plant it, I left the trunk standing upright on a concrete path on the shady and moist side of the house. There it stayed and produced and kept a healthy, green crown of fronds for the remaining years I lived there. Its roots grew horizontally over the concrete and in time formed a flat 10 cm thick 'trunk' about $3m^2$! Another experience I had many years earlier is much more baffling. In those days a common practice was for trunks to be diced into slices several centimetres thick for use as stepping 'stones' in gardens. I was renovating an old garden and had great difficulty in removing some of these manfern stepping stones as they had taken root!

Plants are removed from the bush by cutting through the trunk at the desired height. The remaining stump does not reshoot. At this stage all fronds are also removed for ease of handling and to prevent water loss through transpiration. Some nurseries and roadside stalls sell trunks with fronds intact as an incentive to buy, but these fronds soon whither and die. The trunks are replanted with approximately one-third of the trunk below-ground so as to adequately secure the plant. If the soil is kept moist then a vigorous root system quickly develops from all parts of the trunk below-ground. New fronds also quickly emerge, with their number depending on the time of year. Trunks harvested in late winter produce a complete flush of croziers in early spring. Trunks harvested at other times will send up occasional fronds until the flush of the next spring. The least productive time to harvest trunks is during late spring when the spring flush of fronds are removed, or in early spring when the easily-damaged croziers are emerging. Ideally, trunks should be harvested in winter and replanted before the emergence of the spring flush of fronds. This guarantees an almost 'instant', fully fronded plant. (In practice, winter can be the worst time to harvest when conditions are wettest underfoot.) The fronds in this first flush show no signs of the dramatic events that have taken place to the plant, and have the potential to attain the size of those fronds on an unharvested plant. That potential can only be reached when the trunk is replanted where conditions are ideal. If not, the fronds become dwarfed, burnt and deformed especially when subjected to the drying effects of wind. Successive flushes of fronds during the next several years decrease in size and vigour when growing conditions are less than ideal. The first flush is using energy stored in the trunk from the previous season's growth, and flushes of croziers are a common sight from dry trunks stockpiled and awaiting sale even where exposed to full sun and strong wind.

As they can easily be penetrated by the roots of other plants, and because of their capacity for holding moisture, harvested trunks (with their crown removed) are often sculpted into plant tubs or even fancier plant containers such as wheelbarrows. Trunks are also milled and the fibre used as a major ingredient in potting mixes. Although a practice very much frowned upon today, trunks were once widely laid down side-by-side as a solid base for walking tracks in muddy areas. These trunks were felled in the course of track-making, and croziers and fronds emerging from the 'side' of the track were a common sight.

Personal observations in the wild in Tasmania have shown *D. antarctica* to be very successful at regenerating from spore. In fact, at favourable sites, sporelings are just as prolific as those of opportunistic and 'weedy' native fern species such as *Histiopteris incisa* and *Hypolepis rugosula*. Such favourable sites are often those found following logging operations in high-rainfall areas where there is ample disturbed soil. My guess is, that at such sites, nearly every *D. antarctica* spore germinates. That is, nearly every spore released from the plant that comes to rest where there is at least SOME moisture and light available. The greater the light availability, the quicker the germination rate. But, although most at least begin the germination process, the vast majority wither and die in the first few days or weeks due to the lack of a consistent moisture supply, or by being displaced to a less favourable position by such actions as rain or animal movement. As the gametophyte has no root system for taking up moisture, great losses occur also amongst prothalli in their first months of growth. The decline continues during the first two to three years for the same reason, with the added disadvantage of moisture being required to facilitate fertilisation between two adjacent prothalli for sporophyte production. As the sporophyte grows and develops a root and vascular system it becomes capable of withstanding longer periods of dryness. So, in summary, it is only those spores that by chance come to rest in a microsite (or indeed, nanosite) that can sustain the ideal conditions of light and moisture for at least the first several years of the plant's growth, that have any chance of successfully germinating and reaching adulthood.

As a partner in a fern propagation nursery in Tasmania, over the last couple of years, I have supplied thousands of spore-grown tubes of *D. antarctica* to a customer in mainland Australia who then exports them to England. Compared with most other commercially grown species they are slow in all stages of growth and sporophyte production may be very erratic. The fact that the finished product is a single plant (as in my opinion a treefern should be) results in further losses during stages of clump division. On the plus side, obtaining any quantity of fresh spores is no

problem for one frond releases more than enough for one year's sowing, and except for the some problems associated with the late prothallial stage, the young plant is virtually free of any attack from pathogens. Given that during the last few years there has been a general decline in the nursery industry in Australia, and concomitantly a perceived general decline in horticultural interest in ferns, we have had more time to experiment with propagation of the species. It is now one of our more successful lines (in terms of ease of propagation), albeit still one of our slowest.

Figure 1: ***Dicksonia antarctica*** growing in wet sclerophyll forest in northern Tasmania, showing its new spring growth

There has never been any legislative control over the harvesting of *D. antarctica* in Tasmania. In October 1994 the Australian Federal Government placed a moratorium on the export of *D. antarctica* trunks originating from Tasmania pending the completion of an appropriate management plan. The objectives of this plan are to regulate its commercial harvest at a permanently sustainable level while ensuring the conservation of the species across its present geographical range in Tasmania. The moratorium is still in place as some details of the plan have yet to be finalised.

Trunks have in the past been harvested from forests earmarked for such severe disturbances as clear-felling for *Eucalyptus* regeneration, plantation establishment, or road or transmission line construction, from sites due to be impounded for hydro-electricity development, and from other sites in State forest at the discretion of forestry officers. There has been no control over harvesting on private land.

Because of this lack of control over harvesting and exporting of trunks in the past, there are conflicting estimates as to the numbers that have already left Tasmania. For example, licences issued for harvesting from State forest for a twelve month period ending in 1985 accounted for 15,000 lineal metres (Neyland 1986) (i.e. probably equates to 10,000 - 20,000 trunks). However, one harvester alone was in reality known to have exported 200,000 lineal metres to Victoria over the same period (Neyland 1986). Braggins (1991) states that annually some two million trunks are available on the Australian domestic market, these having been harvested from Tasmania during post-logging salvage operations. Because of the present moratorium, no trunks of Tasmanian origin have been exported since late 1994.

Figure 2: ***Dicksonia antarctica*** surviving in less than ideal conditions at a site in Tasmania which had previously been logged then burnt

One of the likely outcomes of the manage-

ment plan will be the implementation of a workable tagging system. All trunks would be individually tagged at point of harvest and any untagged trunks offered for sale would be presumed illegally harvested. Licences would be issued only to those harvesters who satisfied certain stringent regulations. The industry would become levy-driven with monies used for monitoring such things as *D. antarctica* regeneration at harvesting sites and for research into propagation and the possibilities of farming the species.

There are several propagators supplying spore-grown tubes of *D. antarctica* in Tasmania, and trials have already begun into the feasibility of large-scale growing of the species as an understorey crop in dual-crop plantations. *Eucalyptus* plantation establishment in northern Tasmania is presently at the rate of 3500-4500 hectares per annum (Unwin & hunt 1996) and the results of studies by Unwin and Hunt (1996) suggest that *D. antarctica* may be physiologically suited to their understorey environments.

Field observations indicate that *Dicksonia* trunks grow in height at an estimated rate of 3.5-5cm per year. Allowing between 3 and 6 years for trunk initiation following planting of tubes, under favourable conditions a 100cm trunk may be reached after approximately 30 years. It remains to be seen whether the plantation growth rates will coincide with the *Eucalyptus* rotation rates of 18-28 years for pulpwood or 25-35 years for sawlog production.

The Forestry Commission (1989) (now Forestry Tasmania) estimates that if harvested on a 85 year rotation, an annual cut of 235,000 trunks from State forest in Tasmania is sustainable. Their figure rises to 500,000 trunks per annum with the addition of harvesting on private land. However, they predict that populations on private land would be quickly depleted if harvested at that rate of 265,000 per annum, as much of this land is to be managed for pulpwood with a much shorter rotation rate of 50 years in regenerated forest.

Forest-based industries have historically formed an important part of the Tasmanian economy, and are likely to remain so in the future. While regrowth or virgin forests continue to be logged, many thousands of *D. antarctica* plants will be destroyed in the process unless that resource can be otherwise utilised. That use would appear obvious. At odds with this assertion however, is Tasmania's aim to maintain a 'clean and green' image overseas. It is highly conceivable that, regardless of how right or wrong the practice is, it may raise a few eyebrows when viewed from afar.

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A MEMOIR OF WILLIAM HENRY PHILLIPS (1830-1923)

Paul Hackney and Vivienne Pollock, Ulster Museum, Belfast BT9 5AB

W. H. Phillips was President of the British Pteridological Society in 1904-5 and was an enthusiastic collecctor of native fern cultivars which he grew in his garden at Lemonfield, Holywood, Co Down. He was a friend and mentor of the celebrated Irish naturalist Robert Lloyd Praeger, himself a native of Holywood a small town on the shores of Belfast Lough about four miles from Belfast, and it was Praeger who wrote the obituary which appeared in *The Irish Naturalist*. Praeger had collaborated with Phillips to write *The Ferns of Ulster* which was published in January 1887 as an appendix to the *Proceedings of the Belfast Naturalistsí Field Club*, a work which catalogued all the species and varieties of ferns recorded, with their general distributions and localities, from Ulster's nine counties plus a part of Co Sligo, essentially a provincial fern flora. His association with the Belfast Naturalistsí Field Club was a long one, being a founder member (the club was formed in 1863), later becoming its Treasurer for twenty-five years and its President for the two years 1905 to 1907. Praeger records in the obituary how the club's annual conversaziones frequently featured displays of dried ferns set out by Phillips.

W. A. Phillips (1830-1923) in his garden at Holywood, Co Down (Ulster Museum Collection)

Recently, during a prolonged cataloguing phase of the Ulster Museum's herbarium (**BEL**), a collection of dried ferns, labelled with cultivar names and evidently belonging to Phillips was discovered in the herbarium - the labels bear Phillips' name on the reverse of fragments of Treasurer's forms from the BNFC. The collection is partly mounted on sheets of very large size (580mm x 880mm and 580mm x 445mm) and partly mounted onto blotting paper of approximately standard herbarium sheet size. Amongst the specimens are some examples of the so-called Crawfordsburn Fern, a form of *Polystichum setiferum* discovered in the vicinity of Crawfordsburn in 1861 and formerly much cultivated but perhaps now extinct (?).

Another recent find turned up in the Ulster Museum's historical collections - the discovery of three lantern slides which show Phillips in his garden at Lemonfield. The one reproduced here shows him attending to the care of part of his very large living collection, with pot plants of harts-tongue (*Asplenium scolopendrium*) and what appears to be southern polypody (*Polypodium cambricum*) in the wheelbarrow. The other two photographs show him strolling through a mass of cultivated soft-shield ferns (*Polystichum setiferum*) and standing beside a four-bar gate on which is seated an unknown companion of about the same age smoking a pipe.

Phillips' collection at Lemonfield was reputedly very comprehensive in terms of forms of native Irish ferns and it is a great pity that nothing seems to be known of its fate after his death in 1923.

A VARIETY OF VARIETIES

Heather McHaffie, 108 Granton Road, Edinburgh EH5 1AH

For the last three years I have been cultivating *A. distentifolium* and *A. flexile* and have grown large numbers of plants. This has given me the opportunity to compare parent morphology with the diverse progeny which resulted.

My first spores of *A. flexile* came from Martin Rickard, from a plant which Jimmy Dyce collected on Ben Alder in the early 1970s. The offspring from this plant were very similar, but distinct forms have emerged in sowings from other individuals. The most frequent variety which occurred is one which was first grown by Stansfield. Lowe (1876) in *Our Native Ferns* gives this description:

Var. *Laciniatum*

Raised in 1858 in the fernery of Messrs Stansfield of Tormorden. It is distinguished from the variety *Flexile* by its densely set and laciniated pinnae; the pinnae are recurved towards the base of the stipes, brief and rounded at the end; pinnae decurrent, variously dentate or laciniated, and densely set. Veins branched, venules simply furcate. Sori medial.

The plants are distinctive while still very young. The fronds are thick-textured, with a matt surface, not very vigorous and darker green than usual. The frond has a very irregular outline and looks as if it has been pruned by a passing slug (Figure 1a). So far, none of my plants have been fertile. An Herbarium sheet in the Royal Botanic Garden Edinburgh shows a typical specimen labelled '*Polypodium alpestre flexile* var. *laciniatum* Stansfield, October 1864'. It has only occurred in association with *flexile*. This variety was mentioned as *Pseudathyrium alpestre* var. *laciniatum* by Druery (1911), but has not been in cultivation for some time. Kaye (1968) recorded no varieties of *A. distentifolium* or *A. flexile*. I have never found it in the wild, but a 1990 specimen collected by David Tennant in the Cairngorms has all the appearance of this variety. It is in the herbarium of the Royal Botanic Garden Edinburgh.

It was found that when provided with continuous warmth, an extended daylength and frequent repotting, these alpine plants were easily grown indefinitely in a greenhouse. Several batches of *A. flexile* plants from two localities in particular, Creag Meagaidh near Loch Laggan and Beinn aí Chreachain near Bridge of Orchy produced abundant bulbils under these conditions. A careful search of other cultivated *flexile* plants from most of the known sites produced the occasional example. No bulbils were found in the field, but they might be produced in an extended growing season. The bulbils were usually confined to the axils of the lowest pair of pinnae and soon extended roots (Figure 2).The bulbiferous plants developed very dense crowns.

Another variety came up in a single collection of spores from one *A. flexile* plant from Beinn Eibhinn, not far (as the raven flies) from Ben Alder. This form is very small and congested, with densely overlapping pinnae (Figure 3). It has not yet been fertile and may be sterile. It has neat growth but requires consistent care, as irregular watering has led to distortion in the frond shape. Some of the *A. flexile* plants at Bridge of Orchy have a very wide frond, particularly near the base and many of these plants are relatively larger than those from anywhere else. Druery (1911) mentions another form of *flexile*, var. *Cristatum* which was finely tasselled. I have not found anything like this.

My first plants of *A. distentifolium* were grown from spores collected at Bidean nam Bian in Glencoe and Creag Meagaidh. These both produced two distinct forms, one flatter fronded and more ìleafyî, the other with down curving pinnules. These are observed in the wild and occur regardless of shade or exposure. Some fronds are more finely cut than others which have a denser frond (Figures 1b & 1c) Several batches of *A. distentifolium* have produced an odd form where the pinnae are hardly divided into pinnules (Figs 1d & 1e) A coarse form of *distentifolium* is also sometimes seen with very broad pinnae, broad pinnules, rather large in proportion to the overall size of the frond. The frond is usually very short and wide.

Figure 1a var. *laciniatum*

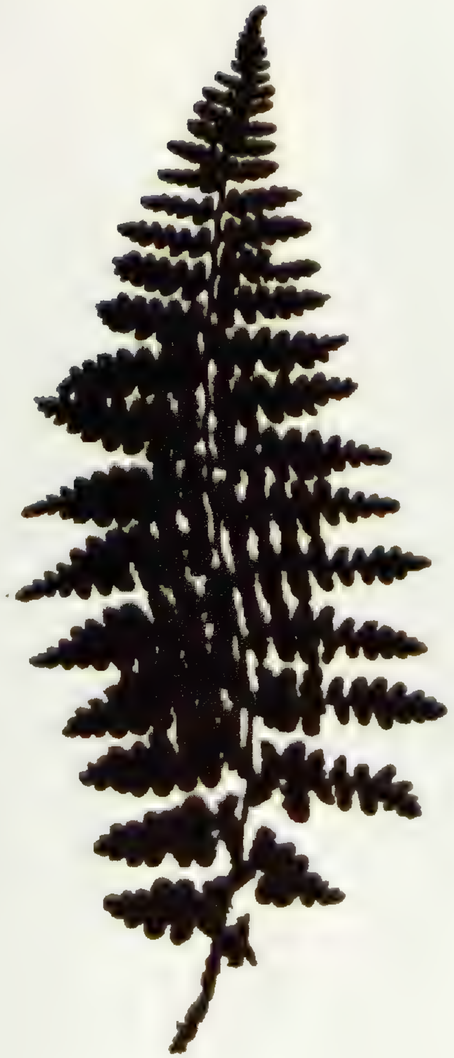


Figure 1b dense
A.distentifolium

Figure 1c finely cut
A. distentifolium

Figure 1d uncut
A.distentifolium

Figure 1e extreme uncut
A.distenfolium

Without illustrations or herbarium specimens it is difficult to match these observations to previously recorded varieties. Lowe (1876) gives two varieties for *A. distentifolium*:

var. *Tripinnatum*

Fronds tripinnate and large, the pinnules attaining a length of an inch and a half; oblong-ovate. Found by Mr G. Lawson at the Wells of Dee, in Aberdeenshire.

var. *Lanceum*

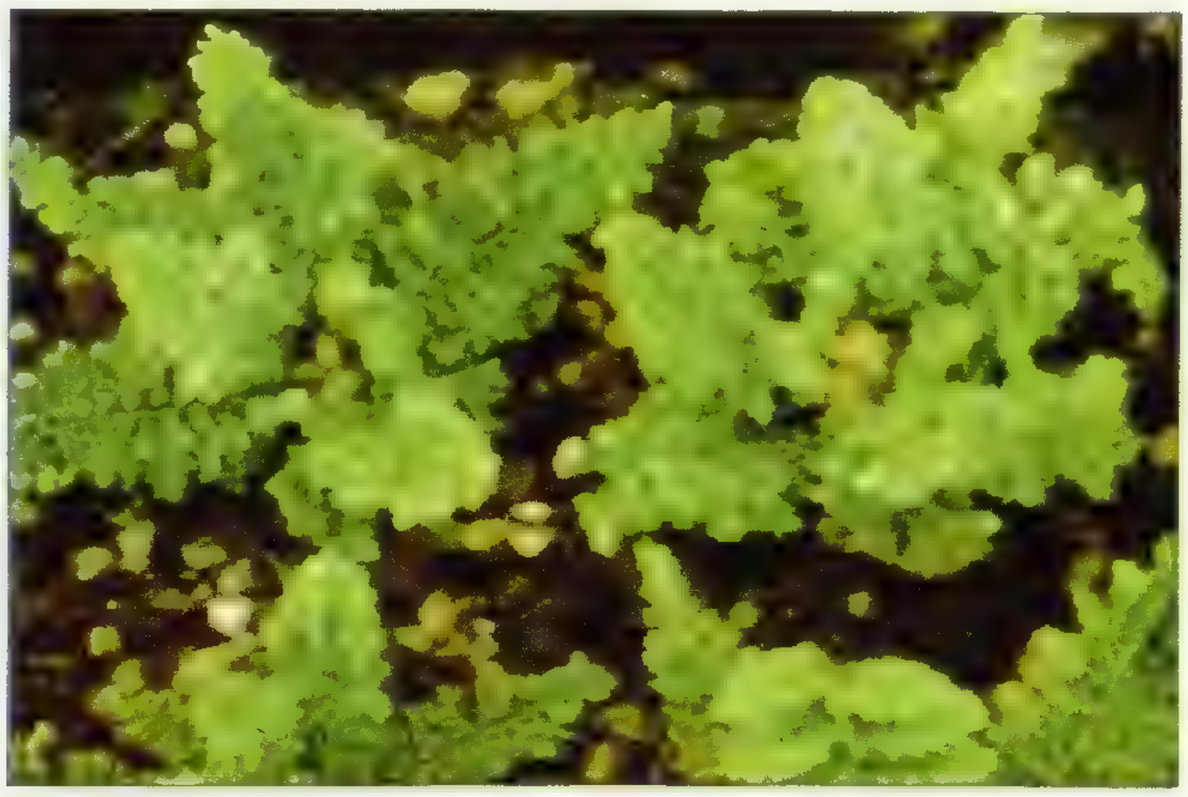
Subtripinnate and large; the pinnules elongate and ovate, lanceolate more or less and profoundly pinnatifid; the pinnules bluntly serrated. This variety was found on the Clova Mountains by Mr G. Lawson and at Lochnagar, Aberdeenshire by Mr Croall.

In the herbarium of the Botanic Garden in Edinburgh there are several fronds of another variety collected by E.S. Marshall from Creag Meagaidh and labelled '*Athyrium alpestre* Milde, probably var. *obtusatum* Syme'. This looks like the narrower-fronded form (Figure 1c) and is also illustrated by Manton (1950).

Another striking variety which is found in North America has been called *A. distentifolium* var. or subsp. *americanum* (Butters) Lellinger. This attractive fern has divided pinnules cut almost to the midrib. The description of Lowe's var. *Tripinnatum* sounds not unlike it. I have some young sporophytes which already look distinctive.

Few of these ferns are more than two years old and I intend to continue to grow a range of these varieties in the garden and watch their future development with interest.

Bulbils



Conjested *flexile* from Beinn Eibhinn

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RESTORED VICTORIAN FERNERY ON THE ISLAND OF BUTE

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Surely one of the most significant (and least publicised) pteridological events in Britain of the last two years was the opening of this restored Victorian Fernery. It is a story of past love, neglect and decay, accidental discovery in a 'jungle', and romantic and dedicated rebuilding and restocking. The place is Ascog Hall, the location is the Island of Bute in the Clyde Estuary (Fig 1), and the energetic restorers are Wallace and Katherine Fyfe who own the property.

The story starts around 120 years ago and is reported in The Gardeners' Chronicle of October 25, 1879, when the fernery had recently been completed. This early article, illustrated

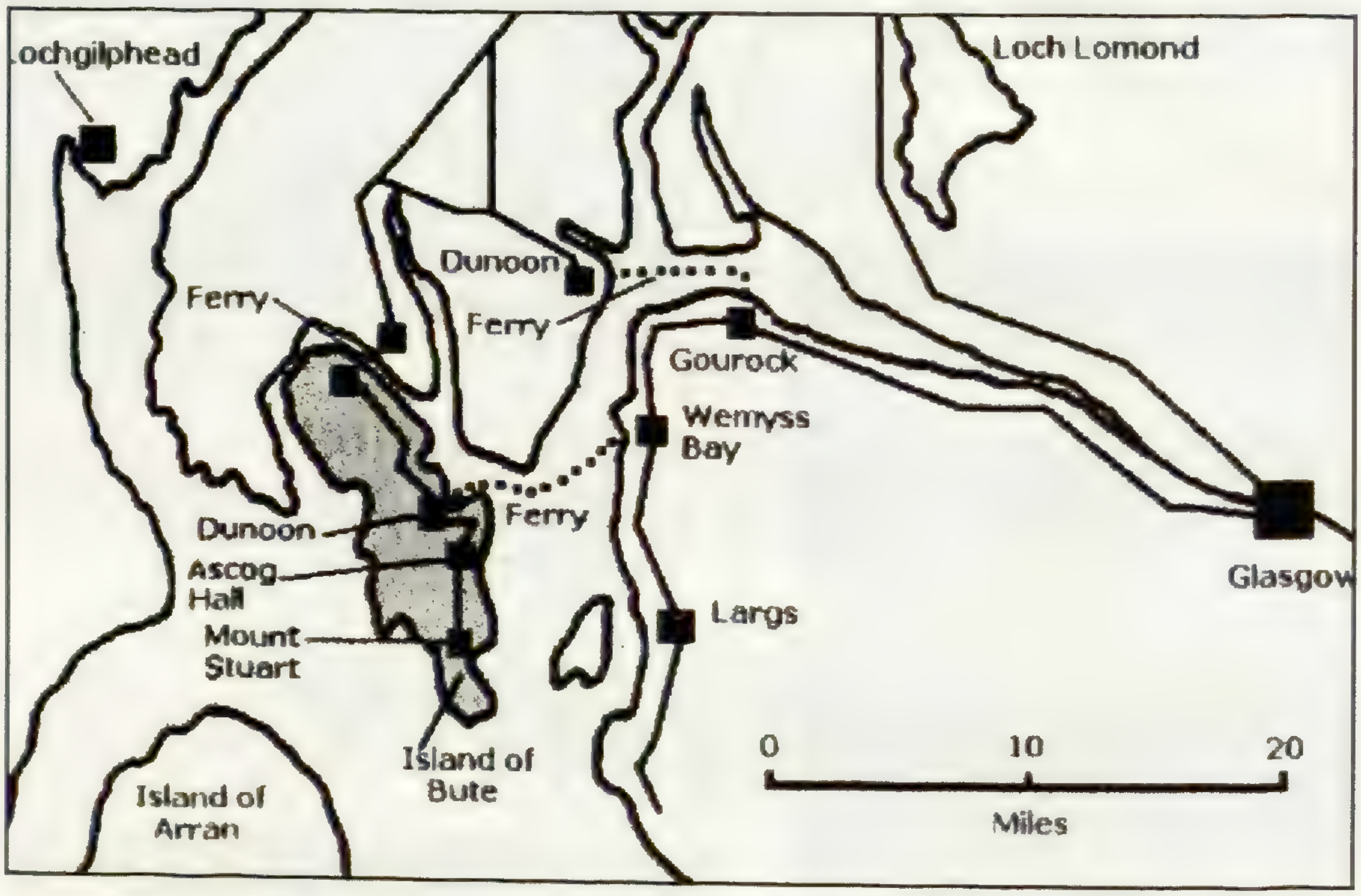

Figure 1. Ascog Hall on the Island of Bute, showing access from the mainland.

with a woodcut showing tree-ferns (Fig 2), describes much of what the visitor sees again today. For the restorers, it provided details of the construction and a list of the ferns in the original collection.

When the Fyfes stumbled on the ruined structure about 20 years ago, they at first did not recognise its true nature. It was totally derelict, the roof having collapsed and the interior cavity, like the basement of an ancient building, was choked with trees and brambles. Miraculously, one large fern had survived, a *Todea barbara* (Figure 5), with a mountainous rhizome about a metre in diameter and 1.5 metres high, still visible today.

The basic structure is an L-shaped canyon, excavated in a natural bank and with a span roof, of metal girders and glass, at ground level. Thus one enters the structure by going down steps as if into a grotto (Figure 6). This semi-burial in the ground allows the fernery to be unheated and yet be suitable for a wide range of sub-tropical vegetation. Indeed, in summer, there is a problem of keeping it cool, even with all the vents open. The interior walls are of the local red-sandstone, in blocks of menhir dimensions that are very sculptural and pleasing. At the far end is a waterfall which divides into a stream that meanders down the centre around a pool with an elongated island crammed with ferns. The whole interior has to be watered every day.

The original builders, and modern restorers, knew all about the psychology of surprise, because the fernery does not properly disclose itself until you are actually inside. You go down steps to an ordinary wooden door, under a sandstone arch, that might lead into a storage shed.

But instead, you find yourself making a transition into an unexpected, brightly-lit world almost of make-believe, with a large *Dicksonia antarctica* right in front.

Everything is identified with professionally-produced engraved labels. The section at the entrance is mainly for Atlantic Island ferns, planted in crevices and natural shelves on the sandstone walls. Among the species are *Adiantum reniforme*, *Asplenium aethopicum* and *A. hemionitis*, *Culcita macrocarpa*, *Dryopteris crispifolia* and *Woodwardia radicans*. Then in succession there are sections for ferns from South-East Asia, China and Japan, South America and Australasia. Particularly striking are the several species of tree-fern, in addition to the *Dicksonia antarctica: D. squarrosa*, *Cibotium schiedei*, *Cyathea cooperi*, *C. lunulata*, and *C. milnei*.

Suffice it to say there is a feast of mainly exotic species, but it is alleged to include *Hymenophyllum tunbrigense*, growing in an odd fashion in a very damp situation on the trunk of the *T. barbara*. It is difficult be certain that it is not the more likely *H. wilsonii*. When we visited in the summer of 1997, the Fyfes had representatives of some of the ferns for sale.

Credits for the restoration must go to Historic Scotland for helping to fund the new greenhouse roof, which would have been impossibly expensive for private owners, and to the Royal Botanic Garden, Edinburgh, for much of the restocking of the fernery. But the major credit must be reserved for Wallace and Kath Fyfe for their vision, initiative and sheer hard work to get the fernery restored and then to maintain it.

Visitor information: Wallace and Katherine Fyfe, Ascog Hall, Isle of Bute, Strathclyde, Scotland. Tel: 01700-504555

Website: http://www.york.ac.uk/depts/biol/web/units/ground/ascog/welcome.htm

The garden is open mid-April to mid-October; closed on Tuesdays. Travel from Glasgow 50 minutes by road or rail to Wemyss Bay, then 30 minutes by ferry (every 45 minutes) and 3 miles by road on Bute. Nearby is Mount Stuart House, also worth visiting, while the island of Bute itself has much else of botanical, historical and scenic interest.

Figure 2. Illustration: The Gardener's Cronicle 1879 (reproduced with permission).

Figure 3: The restored fernery

Figure 4: Inside the restored fernery

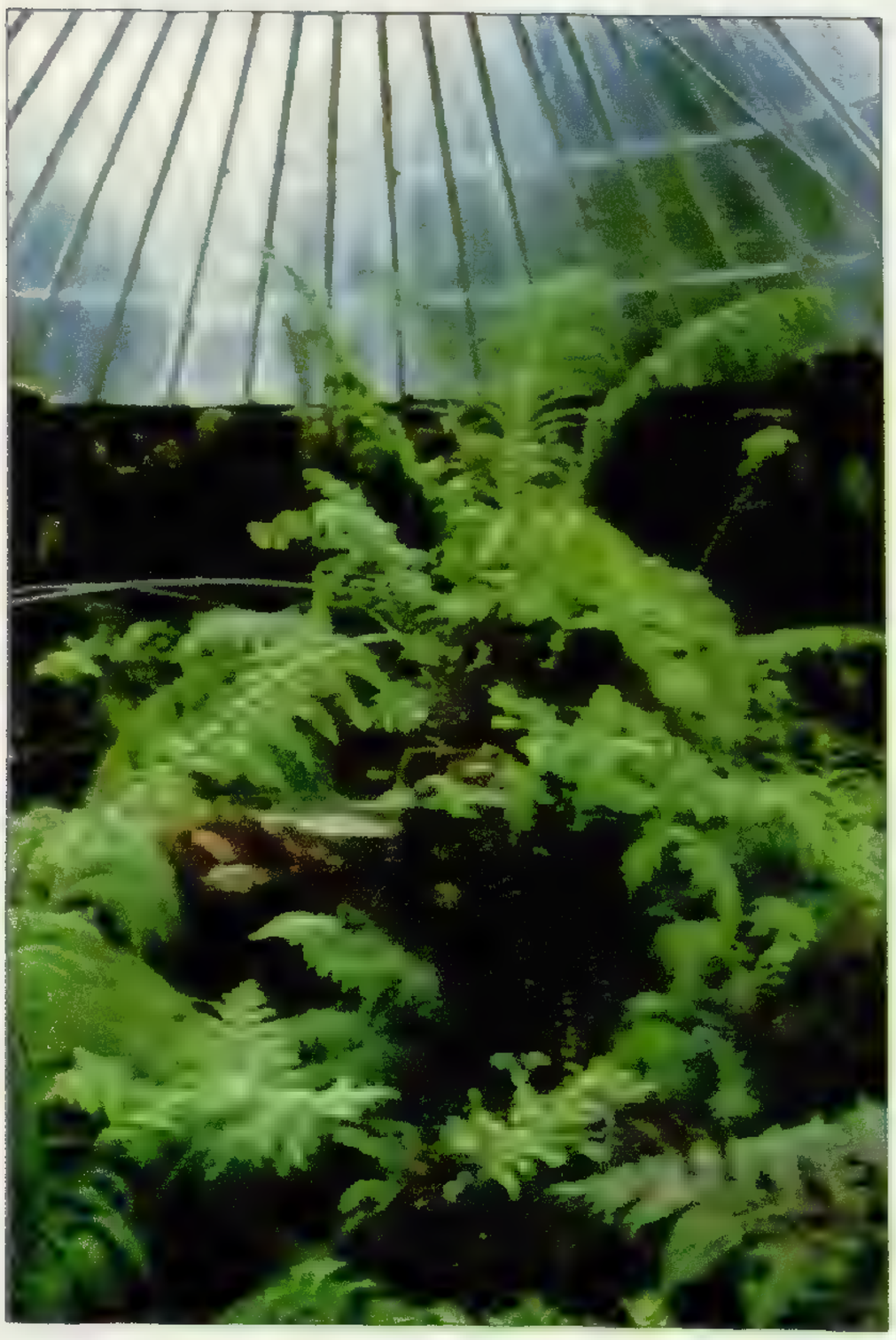

Figure 5: The original *Todea barbara*

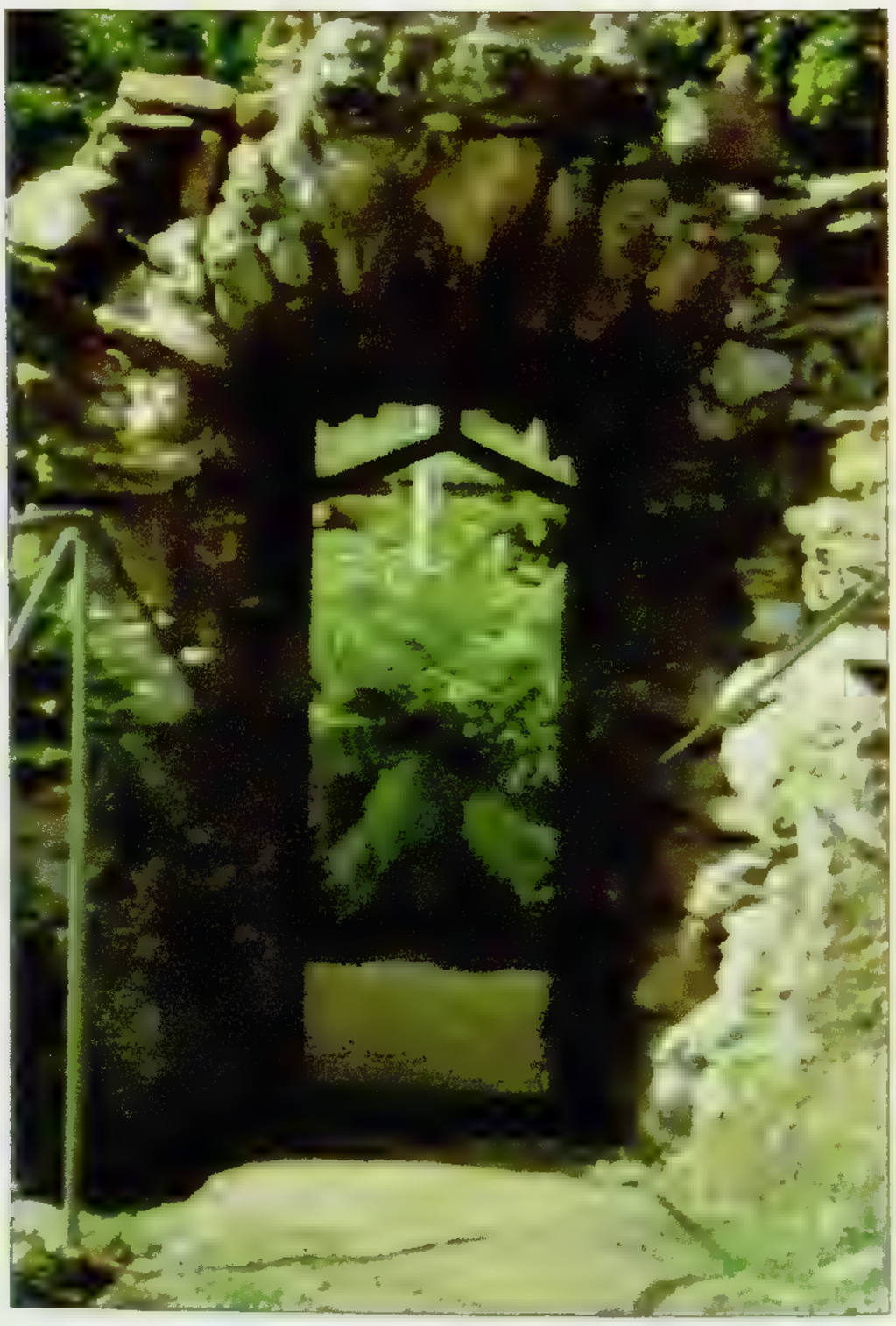

Figure 6: The entrance

Some Thoughts on landscaping with ferns.

Neil Timm, The Fern Nursery, Grimsby Road, Binbrook, Lincs. LN8 6DH

This article makes no claim to be a comprehensive review, of the enormous subject, which the title could be said to cover. Indeed the main reason for writing it, is simply to arrange in a formal fashion, a number of random thoughts which I have had on this matter in recent times. Hopefully, however, it will prove to be of interest to the members. At the least as a stimulant to their own thoughts, especialy, as it is a subject, which I am often disapointed to find, is but weakly covered in most fern literature. Apart, that is, for one old chestnut of which more may be said later.

To begin with it seems like a good idea to clarify, exactly, what we get, in landscaping terms, from ferns. It seems to me that, they have three important qualities, which distinguish them from other plants, and are of value to us in garden design. Firstly, they are entirely dependant on foliage for their effect, and that this foliage is very strong indeed on the quality of pattern. Secondly, that the overall shape of the plant is important to its impact on the garden scene. And thirdly, (since I am talking here mainly of temperate woodland, ground layer ferns), that they tend to have a fairly consistent, and predictable size. By which I mean that, they grow to some sort of maturity in a few years, and then, especially if kept well and divided now and again, can be expected to retain a fairly constant size for a good while. These three qualities, if we stop for a moment to think, in one group of plants are quite unusual, since the first two, are normally only found together, in woody plants, and the third mainly in herbaceous perrenials. All of which of course is to make no mention, of the overwelming value of pure lush greenness. Especially for those who find that in a modern world, where vibrant colour is constantly inflicted on us, that the traditional veiw of a garden, as a blaze of colour, no longer wholly satisfies.

Even given my short and probably incomplete list, it would seem that ferns, therefore, well deserve a good deal of care and attention in their garden use and display. The properties of pattern and form to begin with, obviously deserve to be enhanced as much as possible. Therefore, as the natural and best way to enhance pattern, is of course, to repeat it; it is, I am sure you will agree, even more valuable with ferns, to plant in clumps of three, four or even more, than it is with most perennials. Not to say that it is ever wrong to plant ferns singly; but if we wish to repeat, the sort of spectacle, often given by large banks of ferns. Which most members must surely have admired, growing wild in our woodlands. Then it is well to be aware that this effect depends, on a certain amount of uniformity, and could be harmed by too diverse a collection of plants. Pattern and form can also be lost, if other types of plant material, similar in size but different in form, are placed close to the ferns. This I think is the main problem in mixing shrubs with ferns, though certainly, the obvious cultural fact, that shrubs are ferns' natural competitors, for space, light and soil does not help. If planting shrubs with ferns I would tend therefore, to use only single well spaced bushes, which could be seen from all sides, thus setting up a pattern of their own, to complement that of the ferns. The low hanging foliage of trees can also have a weakening effect on a visual pattern, and it would seem to be, in general, good practice to keep this well clear by pruning, with the bonus that this uncovers more of the trees trunks. Hopefully if you have more than one tree, forming their own pattern, this inevitably makes the perfect, and most classic compliment for the ferns we could wish for. I would perhaps also wish, in my garden, even at a much lower level, to restrict myself to plants having good shape and form, avoiding as far as possible all intrusive perennials and ground cover. This would mean, only strongly formed plants in their own right, like the candelabra primulas, Bergenias and Hostas, so often used, and fine low ground cover plants like mosses or the pearlworts. When growing ferns in a naturalistic setting, it would of course be only natural, to restrict the accompanying ground cover still more, to only those plants, you might find growing with ferns in the wild, but as there are no shortage of these, such as *Ajuga reptans* and heather etc.,(not to mention the smaller ferns like *Gymnocarpium*), this should be no problem. I think that it would also be well within the abilities, of imaginative gardeners to create much interest in the form of ground cover, using only hard matterials. I realize naturally that growing ferns in rockeries is quite conventional, but I have seen few examples of ferns used with hard matterials, on the flat; that is to say, with rocks, gravels, pebbles and other forms of 'scree'. Perhapes with

polythene used in the usual fashion, to deter weeds. This form of planting certainly looks very natural and, from my own experience, ferns do indeed revel in this form of mulching, though the tidying of dead fronds etc. may need a little more attention.

While most people think of ferns, for the most part as plants for the wilder parts of the garden, there is of course, no reason why they should not be used in a much more formal way. Indeed their qualities of having, fairly, predictable shape, form, and size, lends them ideally to this use. Why not for example, replace the gravel or scree matterials just discussed, with the paving of patio or path. All that is needed, is to lift a single paver, and to plant the fern. It will love the cool root run afforded by the paving, and you can rely on it not needing constant pruning or clipping, to prevent it overwhelming the light and space intended for us. Another practise very like this, which I have seen used in the past to great effect, is to use ferns to mark the corners of paths and similar places. I would consider that, in settings like these, the strong form of many ferns, gives a grace and dignity,with perhapes a hint of the victorian. This well justifies their use, away from their native haunts of wood and wilderness. For those who do not find that the attachment of ferns to wilderness is too strong for their taste to enable them to accept the use of any pteridophytes in a formal garden setting, there are a multitude of ideas which spring to mind. Ferns are, for example, ideal for use as edgings and in many of the landscaping roles, where plants like box would often be used; this is especially true of the smaller evergreen ferns, like Scolopendriums for instance. Please see Martin H. Rickards article, in the Pteridologist, Vol.2 Part1, for suggestions for the use of Polypodiums in this way. The use of large ranges of ferns to make formal patterns by interplanting materials, like paving could with a little imagination, be stretched almost infinitely to make all manner of knot gardens, Simpler geometric and free forms mixed with the hard materials, or more subtly, to soften larger areas of hard landscaping, with a splash or two of quiet greenness inserted among the paving.

Much can in fact be done in the wilder part of the garden by planting in lines or various planned shapes. You only need, for instance, let an irregular line of ferns weave down a slope or hill side, with perhapes a few rocks, and a slight indentation engineered with spade and rake, and you have subtly suggested the existence, of a rill or water-course, where none exists, whilst a circle of ferns and horsetails in a hollow, hints at a pool or bog. This sort of simple understated sketch of a *tromp l'oeil*, deserves, to my mind, much more respect and a more widespread use, than most of the illusions attempted in gardens.

Wether in the wild, or in the more domesic parts of the garden, it is often usefull to make changes of level in order to add drama and to raise plants nearer to, or even above, eye level. It really probably does not need me to point out the especial advanages and conveniences, of doing this with plants of moderatly predicable size and form. In fact this is very much the basis, upon which the ferneries and grotos of victorian times, which must be familiar to all members, were built. Today, though, it is certainly not a necessary compultion of taste to go to these lengths for simple raised beds, or hollow walls, will serve just as well, in the modern garden. Or why not stand the whole idea on its head, and sink the path instead although it must have both enough width to allow plant growth and drainage must exist by natural means or other; but none of this is difficult. Alternativly you can, if you wish, plant ferns at a lower level than the veiwer. For one of the best ways to view the symmetry of a ferns fronds, is surely to look strait down into the centre of the crowns from above.

There is no reason, in landscaping terms, why ferns should not be used in a subsidiary role to other plants, and certainly, many make excellent ground cover, the best to my mind being the Hart's Tongues. Though I have seen *Gymnocarpium dryopteris* used in a very famous garden, as mixed ground cover along with Pulmonarias and plants of similar stature where it had been holding its own for some years with little help from the gardeners.

Finally, of course, if none of this is to your taste there is always the old chestnut of the gardening magazines (If they mention ferns at all.) of planting the foot wide strip, the builder leaves, between the north wall and the paving. Though to my mind this is not a good way to display anything! Not that there is a thing wrong with north walls, but let us at least lift a few slabs and make it three feet wide please. But now I am surely begining to preach to the converted anyway so I shall stop.

GREENCOMBE - THUMBS UP

by Joan Loraine, Greencombe, Pollock, Somerset

Polystichums were Jimmy Dyce's favourite fern. I remember him stating this on more than one occasion when we were fem-hunting together. "Polystichum are my favourite fern", he would say, "clematis are my favourite flower, and my favourite .." But something significant always happened at this point, so I never discovered his next favourite thing.

When Jimmy said this he was speaking of the Soft Shield fern, *Polystichum setiferum*, with which he was not familiar until he came south from his native Scotland and went fern-hunting in Dorset, Somerset and Devon, where the Soft Shield is very much at home. He went with Percy Greenfield, a great fern man, whom he described as 'my beloved mentor'. This mentor extended Jimmy's interest to include not only fem species but also fem varieties, and stirred his hopes of discovering a new form of *Polystichum setiferum* 'Divisilobum', which, at that time, was the fem of the day. His searches among those elegant shuttlecocks, through fronds that have the quality of an etching, they are so well defined, made this his favourite fern - although, to his grief, he, who found so many varieties, and had such a quick eye for the unusual, never came upon a *P. setiferum* 'Divisilobum'.

Of course Jimmy loved the fem that has produced more varieties than any other fem is known to have done. When Lowe in 1890 first classified this fem's inventiveness, he listed 366 named varieties. Doubtless not a few of these were almost identical. The B.P.S.'s selected list, published in Druery's The Book of British Fems in 1902, had already reduced the number to 173. Alas, at the moment, this National Collection has only 90 varieties!

Let us begin with the species. Of the three that are native to these islands, the rarest is *P. lonchitis*, 'the narrow-leaved polystichum' or Holly fern, with leathery texture and pinnate fronds, a lover of limestone pockets among shaded mountain rocks. I remember Jimmy searching the shady side of Snowdon in order to introduce me to the Holly fem. Since then I have hunted for it in the Austrian Alps and in the Carpathians but have never found it in a group or colony, always on its own, beside a rock, at least five yards from its closest neighbour. At the moment, true to style, it is one on its own at Greencombe.

Polystichum aculeatum, the 'hard shield fem', is a handsome shuttlecock, shiny, wintergreen and hard to the touch. "If you're in doubt", Jimmy taught me during my salad days, "Feel the frond. That's the way to be sure".

Apart from feeling, there are two ways of recognising *Polystichum*, and the first is revealed to us in the name, which comes from Greek: *polys* for many and *stichos* for rows, referring to the lines of sori on the backs of fertile fronds. The vemacular name 'Shield', which is also used in German, indicates the round membrane or indusium that protects these sori; the central stalk, that holds it in place, makes it resemble a shield.

The second method of recognition is even easier and provides a simple name: the 'thumbs-up fem'. This, although my invention, was a gift from Jimmy. With characteristic enthusiasm, he had undertaken to teach me all the fairly common ferns over one brief weekend. When I hesitated over naming a *Polystichum*, he pointed out that each pinnule had a small thumb-like protrusion on the stalk side. This was great information. Moreover, I realised gradually that this thumb is the hall-mark, the indisputable sign, of *Polystichum* right across the world; there are some 225 species and they are all 'thumbs-up' ferns. It gives them a name that everybody can pronounce and everybody wants to understand - and when people are shown the thumbs, they feel they have been admitted to a secret.

I have had to import *Polystichum aculeatum*, and have obtained its variety 'Grandiceps', but the 'thumbs-up' that was Jimmy's favourite fern grows naturally on this dry acid north-facing slope. It belongs here, where the land drops from the hills of Exmoor to Porlock Bay and the Severn Sea. About quarter of a mile away there is a colony of several acres uninterrupted *Polystichum setiferum*, forming ground cover under old oak. That colony has been my way-mark: I wanted the National Thumbs-up Collection to look as lovely and inevitable as those polystichum, to form an intrinsic part of the garden - not some well-meant imposition, to add interest and beauty, to proclaim the wonder of the ferns, and to make this wonder more comprehensible to the viewer. There were to be no labels, which get moved, and lost, by

P.setiferum. a. 'acutilobum' probably 'Hartley'.xl, b,
A probably wild plant with 9 crowns and 70 fronds held just above horizontal. x0.6

badgers, birds, dogs, cats and squirrels, as well as humans. Instead, the fems were to be grouped in such a way that a written guide with names could be followed easily.

This meant reorganising the varieties of Soft Shield fern into groups, according to their type of variation - but not, unfortunately, starting as though from scratch, with a clear sheet, because it was essential to avoid needless disturbance, especially to non-fertile fems. The result is a 'Polystichum Walk', dictated, to a great extent, by the ferns themselves.

It begins on the main lawn.

Before my time - which means before 1966 - a handsome *Polystichum setiferum* 'Acutilobum' was planted there in a sunny place. It was probably planted about 1950 and has formed 20 crowns, the tallest of which is 10 inches high. (Jimmy always said that all fems approximate to the condition of tree ferns). It has a distinctive airy look, with the fronds held horizontally, as in *P. setiferum* 'Acutilobum Hartley'; it has never produced bulbils, but there are iittle bumps along the rachis which might tum into bulbils were it in a shadier place. This acutilobe is responsible for the 15 others in this part of the garden and for many that have been given away. Its first sporling is identical and quite a few are similar, but it now includes a good divisilobe among its offspring. I find the variability from this one fem fascinating. Holding the fronds horizontally has remained a characteristic, and so, in all but one, has the lack of bulbils. Their greatest beauty is uncurling in spring, with every rolled-up frond and pinna tip silver-white.

They are no longer the only acutilobes in the garden. A few years ago a North Devon family chanced to hear that Greencombe had the National *Polystichum* Collection, so they brought me a bulbil-grown plant from a fern found by a grandparent in the 1890s, and treasured by them every since. This is 'Granny Thorn's fem' a good acutilobum, laden with bulbils which, on horizontal fronds, are produced at soil level. I am hoping to leave these to grow where they are.

The thumbs-up walk continues, inside First Wood, with the foliose group, in which the fems are strikingly different from the fine acutilobes in the garden. This group is here because, by happy chance, in 1976, I planted *Polystichum setiferum* 'Plumosum Grande Kaye' in this area, not knowing then what a treasure I had. It had been less than six inches high when I bought it, at Waithman's Nursery, on Reggie Kaye's advice. "That'll be good", he said, picking one out from a group of youngsters and putting it in the box of ferns we had collected together. It was golden-green and upright and has remained so ever since. Now it is over three feet high; it does not flop, nor need support, but produces neither spore nor bulbils. In 22 years I have secured one other plant: the original made a small secondary crown, which I severed, taking as much root as possible; then, potted up, it was kept in the Intensive Care Unit for a year. It is now as good as its parent, and planted nearby. When I did the same thing a few years later, the offset died.

One of the National Collection rulings is to have three plants of each type; these would normally come from three different sources, but in this case that is impossible. I wonder what happened to the other sporelings in that batch - or did Reggie's knowing eye pick out the best? The next time I was with him in Silverdale I asked whether the fern had come from the famous *P. setiferum* 'Plumosum Mol'y. "No, no", he said, "It was not Moly's, it was mine: 'Plumosum Kaye"'.

A few years later I obtained a *P. setiferum* 'Plumosum grande Moly', and planted it opposite *plumosum* Kaye, so that the two could be compared with ease. Moly holds the fronds at an angle of about 40 degrees, and may, in future, with the vigour of maturity, need support; Kaye has never been propped and, to date, is both taller and more plumose.

Another of the best fems in this group is also of Reggie's breeding: *P. setiferum* 'Foliosum Kaye'. It is distinctive because of the typical polystichum curve or twist near the top of the frond; erect, handsome and very foliose, it is also fettile. This is the distinctive difference between 'plumose' and 'foliose'; ferns called plumose are sterile and those called foliose are fertile, but I have planted them as one group because, to the eye, the outstanding characteristic is the fulness of the pinnule, and consequent resemblance of the pinna to a small frond. It is a beautiful group and contains also *P. setiferum* 'Foliosum grande Walton', which holds the fronds just above horizontal and comes true from spores.

The next section I originally listed as 'multifide or forked', but this is an ugly use of language and conjures up no image. Instead, I would like to call it branched. It began with polystichum I

P.acutilobum 'Granny Thorn'. x0.7

P.foliosum Kaye with erect fertile fronds 30cm or more in length.
No bulbils present. x0.7

P.acutilobum fertile horizontal frond with no bulbils. c. 43cm.

rescued, with permission, in 1973 from Underway, the famous garden created by Norman Hadden between 1918 and 1972 at West Porlock. The ferns were in very poor condition, having been heavily over-shadowed for a long time; the two that are here turned out to be rather ordinary *P. setiferum* 'Framosum'. Next to them is a handsome *P. setiferum* 'Framosum Rickard' - very well branched - a *P. setiferum* 'Capitatum' from Kaye, and a fine plant given to me by Pat Coughlin (he was a beautiful gardener and all his plants were fine) and called by him *P. setiferum* 'Trifidum'. At first I thought this name was accurate, but it makes more than three divisions at the top, and then sub-divides and sub-divides again, just like the *P. setiferum* 'Capitatum' from Reggie. Yet these two are visibly different; in Pat's the pinnules - which are bigger to begin with - become foliose and ctinkly after branching, whereas in the fern from Reggie they remain flat. Moreover, Pat's produces a fine crop of bulbils, but Reggie's not a single one.

We move on to 'the unusual lobe' group, in which the emphasis is on vatiation in the lobe. Here belong, among others, *P. setiferum* 'Manica infantis', which does not mean 'manic child' but 'baby's glove', referring to the outline shape of the pinnule; P. setiferum 'Rotundilobum', which has round lobes; *P. setiferum* 'Hirondelle', in which the narrow lobes resemble swallows in flight; and *P. setiferum* 'Perserratum' with many incisions in the lobe.

And so to the 'crested group', which - forgive me, Jimmy - I find fascinating; it is so richly varied and so attractive. A tailored *P. setiferum* 'Polydactylum' - or 'many flngered thumbs-up' - given to me by Mary Potts, has undivided sickle-shaped pinnules, that curve towards the tip and lie flat; every pinna, and the tip, ends in neat flattened ctests, which accentuate the unusual look of the frond. Beside this is a *P. setiferum* 'Cristatum' from the Whiteside collection; every pinna, every tip, is 3D crested, as if the fem were dancing. Then comes another fine gift from Pat Coughlin: in this *P. setiferum* 'Divisilobum multifidum' the curve in the fronds, upwards and outwards, forms a central bowl, wherein the hairy chestnut-coloured rachis display their bulbils. It is most unusual.

When Robert Sykes visited in 1991, he brought me a *P. setiferum* 'Cristato rotundatum', a huge plant, on which I had to use a hatchet to divide it in three; they all crest well, and one is in danger of becoming a 'Grandiceps', having produced an outsize frivolity at the top of one frond.

Further on is 'the narrow fronded group'. This includes *P. setiferum* 'Revolvum Lowe', in which the pinnae curve over, thereby making the fronds, which are upright, look tall and narrow. Also in this group is a chance narrow Greencombe sporeling and a *P. setiferum aff.* 'Wakelyanum' with opposite pairs of pinnae crossing over each other- a form originally found by Mrs Wakeley in South Devon in 1860, and called after her.

We come to one of my favourite sections: the 'congested group', in which the plants are small and both pinnules and pinnae overlap. There are seven of these, all different; four I acquired fern-hunting with Reggie Kaye across the space where his greenhouses once stood. Superficially this looked desolate, but walking slowly over the gravel, and looking down intently, a host of sporelings were waiting to be found among the broken glass and fallen wood.

We have reached the largest group: the divisilobes. Just as acutilobes, with the pinnule lobe undivided, dominate the garden, so do divisilobes, with divisions in their pinnules, dominate the beginning of Middle Wood. They are very handsome and show up well on a raised area beside a sunken path. Perhaps the finest is one bred by Phillip Coke and called by him *P. setiferum* 'Divisilobum formosum', which of course means beautiful. It is as fine as hair and bright green.

Beyond the divisilobes are the plumos-divisilobes, in which every pinna is a multi-lobed miniature, and one pinna spreads out above another, resembling lace over lace. The fronds are held horizontally and show the clockwise curve that is characteristic of this particular thumbs-up fern, which I think is 'Esplan'. There are 14 of them, grown frm bulbils when I realised the original was on the way out. This repeat spread is always a joy to see.

Nearby there is another plumose group called 'Bevis', after the wild find made in a Dorset lane by John Bevis in 1876.

How wonderful to be remembered by a fem like this: upright, glossy and dark green, 'the graceful fronds have elongated divisions of a silky texture, the pinnae near the frond tip curving together to form a tail' (from Hardy Fems by Reginald Kaye). It is exceptionally elegant and one of the most remarkable varieties ever found. On very rare occasions it produces spores, and the

Pinnae of *P.divisilobum* : Greencombe sporelings. *a.* 'Elizabeth May', *b.* 'Dolly Strangman', *c.* 'Alice Lorraine', *d.* 'Pixie Lorraine'. Natural size

results of these, in the hands of Druery and Green, were even more beautiful.

Alas, the Bevis group here is very poor at the moment. I planted seven, aiming at a fine stand; they were ravaged by squirrels. Only frequent watering through last summer kept them alive. Then a week or so ago a visiting badger helped himself to fronds, considering, no doubt, that they would make suitable bedding.

The thumbs-up path continues, into Far Wood, with Polystichum from Japan (where there are 30 species), Asia - including a *P. stenophytlum* from the Great Wall of China -, Madeira and North America. To date there are 20 species in the collection; I do not anticipate acquiring them all. We end in the ditch built in the 1300s, to keep the red deer from getting out. In this sheltered place native *P. setiferum* flourish, some with a clockwise and some with an anti-clockwise twist to the fronds. Not one of these originals has ever been disturbed.

There is still another section, one that actually pre-dates my meeting Jimmy: the Greencombe group. These are at the opposite end of the garden; walking back we can see what a great contribution the thumbs-up make to the wood here, how they fumish and please. They are delighfful in spring but to me their greatest value comes after mid-summer, as the fronds grow and they reveal themselves. Through winter they are outstanding.

Basic care is simple. Old fronds are cut just before the new unfurl. The plants get a heavy dressing of leaf-mould, spread one inch thick over the ground they occupy, about every 18 months. This helps to keep them moist at the roots, and reduces weed. During the growing season they are watered, once, with liquid seaweed. Any that are running back are lifted, potted up and retumed to the Intensive Care Unit. The advantage of this is that, potted, they do not have to compete with the roots of other plants; they also get regular watering.

So we come to the 'Greencombii'. There must have been a time when the *P. setiferum* 'Plumoso-divisilobum' that was here when I came, and from whose bulbils I grew the spread in Middle Wood, actually spored. For four years running, just a yard or two from that fern, I found sporelings that even to my then uneducated eye were exceptional. I planted them in the same area, and they grew, and each one is different; they are outstanding, upright, plumose-divisilobes- unique.

What of the future? The first essential is to establish Bevis; that is vital. Then, to obtain *P. setiferum* 'Plumosum Druery', one of the Bevis's outstanding off-spring; to establish the holly fern, probably through spores; to pot up a single crown of *P. setiferum* 'Pulcherfimum Moly's Green', the only survivor from the one-time pulcherrimum group and a present to me from Jimmy - and find out whether the restfiction forces it to show its 'Pulcherrimuml character; to pursue the historical polystichum; and to check and re-check the way in which the groups are organised as Jimmy, our great thumbs-up expert did, working at it when he was over 85.

A WINTERGREEN *GYMNOCARPIUM*

Martin Rickard

Of all the ferns I grow on the nursery I consider the species of *Gymnocarpium* amongst the first to succumb to the frost and loose their leaves. The species in question that I grow are *G.dryopteris*, *G.robertianum*, *G.jessoense* and *G.fedtschankianum*. These are all morphologically rather similar but all worth growing in their way. There is, however, a fifth species I grow which is very different, *G.oyamense*. It is morthologically different from the other four so I suspect it is only a matter of time before it is moved into a different genus. Be that as it may, for the moment it is as far as I know still a gymnocarpium, and at the time of writing (29.1.98) it is still wintergreen with me in an unheated polythene tunnel. The way it is going it may turn out to be evergreen, at least in a mild winter. I have grown it for ten or fifteen years as a garden plant, and it has done well in a sheltered spot but I cannot remember whether it was wintergreen or not. I dug my main plant up when we moved and I now use it for showing so I do not have it in the garden any more. Has anyone else noticed this phenomenon? My plant is reported to have originated from Papua New Guinea, but the species is well distributed through south east Asia, including Taiwan.

Fern names in Gaelic and Irish
Scottish Gaelic fern names with corresponding Irish names

Joan W. Clark
Tigh Solàis, North Ballachullish, Argyll, PH33 6SA.

Over the past 20 years I have been collecting Gaelic names given to Scottish flowering plants and ferns (Clark & MacDonald, in press). Stimulated by a list of Irish names pick up off the Internet (Ottway 1998) by Josephine Camus and drawn to my attention, I thought it might be of interest to compare the Scottish and Irish names. In my researches I had already compared those Irish names published by Scannell & Synnott (1987) In a few cases I have added (in italics) common synonyms in the two vernacular languages. The species are listed in the order they appear in the BSBI database at Leicester University.

As with Jimmy Dyce, I am by birth an Aberdonian. I am only sorry that I cannot give a list of Doric names. Perhaps other members can. I am most grateful to all who have contributed to this list.

Latin	**Gaelic**	**Irish**
Lycopodium clavatum	Garbhag nan Gleann	Garbhógach na mbeann
Lycopodiella inundata	Garbhag Lèana	Garbhógach chorraigh
Huperzia selago	Garbhag an t-Slèibhe	Aiteann Muire, Cruibini sionnaigh
Diphasiastrum alpinum	Garbhag Ailpeach	Garbhógach shléibhe
Selaginella selaginoides	Garbhag Bheag	Garbhógach bheag
Isoetes lacustris	Luibh nan Cleiteagan	Lus an chleite
I. echinospora	Lus cleite an earraigh	Luibh Cleite an Earraich
Equisetum hyemale	Biorag	Bioróg
E. variegatum	Earball an Eich Caol	Scuab eich bhreac
E. fluviatile	Clois	Scùab eich uisce
E. arvense	Earball an Eich Achaidh	Scuab eich ghoirt
E. pratense	Earball an Eich Dubharach	Scuab eich mhóinéir
E. sylvaticum	Cuiridin Coille	Scuab eich choille
E. palustre	Cuiridin	Scuab eich chorraigh
E. telmateia	Earball an Eich Mòr	Feadóg, Gliógan
Botrychium lunaria	Lus nam Mios, *Luan-lus*	Lus na miosa
Ophioglossum vulgatum	Teanga na Nathrach	Lus na teanga
O. azoricum	Teanga na Nathrach Beag	Lus na teanga beag
Osmunda regalis	Raithneach riúil	Raineach Rioghail
Cryptogramma crispa	Raineach Pheirsill	Raithneach chas
Adiantum capillus-veneris	Failtean-fionn	Dúchosach
Hymenophyllum tunbrigense	Raineach Coinnich Fiaclach	Dallán coille
H. wilsonii	Raineach Coinnich	Dallán Sléibhe
Trichomanes speciosum	Raineach Chill Airne	Raithneach Chill Airne
Polypodium vulgare	Clach-raineach Chaol	Scim chaol
P. interjectum	Clach-raineach Mheadhanach	Scim mheánach
P. cambricum	Clach-raineach Leathann	Scim leathan
Pteridium aquilinum	Raineach Mhòr	Raithneach mhór
Thelypteris palustris	Raineach Lèana	Raithneach chorraigh
Phegopteris connectilis	Raineach Fhaidhbhile	Raithneach feá
Oreopteris limbosperma	Crim-raineach, *Raineach an Fhàile*	Raithneach bhuí
Phyllitis scolopendrium	Teang' an Fhèidh	Creamh na muice fia
Asplenium adiantum-nigrum	Raineach Uaine	Fionncha dubh
A. onopteris	(not in Scotland)	Fionncha biorach
A. billotii	Lus a' Chorrain lannsach	Fionncha lansach
A. septentrionale	Lus a' Chorrain Gòbhlach	Fionncha ladhrach

A. ruta-muraria	Rù Bhallaidh	Luibh na seacht ngábh
A. marinum	Raineach na Mara	Fionncha mara
A. viride	Ur-thalmhainn	Fionncha glas
A. trichomanes	Dubh-chasach	Lus na seilge
Ceterach officinarum	Raineach Ruadh	Raithneach rua
Athyrium filix-femina	Raithneach Mhoire	Raithneach Mhuire
Gymnocarpium dryopteris	Sgeamh-dharaich	Raithneach dharach
G. robertianum	Raineach Cloich-aoil	Raithneach aolchloiche
Cystopteris fragilis	Frith-raineach	Raithneach bhriosc
Polystichum lonchitis	Raineach Chuilinn	Ibheag dheilgneach
P. aculeatum	Ibhig chruaidh	Ibheag chrua
P. setiferum	Ibhig Bhog	Ibheag bhog
Dryopteris oreades	Marc-raineach nan t-Slèibhe	Raithneach shléibhe
D. filix-mas	Marc-raineach	Raithneach mhadra
D. aemula	Raineach Phreasach	Raithneach chumhra
D. carthusiana	Raineach Chaol	Raithneach chaol
D. dilatata	Raineach nan Radan	Raithneach leathan
D. affinis	Mearlag	Raithneach ghainneach
Blechnum spicant	Raineach Chruaidh	Raithneach chrua
Pilularia globulifera	Feur a' Phiobair	Lus an phiollaire
Azolla filiculoides	(not in Scotland)	Raithneach uisce

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SONNET TO A FERN

Come walk with me into a woodland glade,
Where in moist leafy stillness grows the fern,
Elegant enigma in dappled shade,
With many ancient secrets we must learn.
Un-noticed and ignored by passers-by,
(Bright-hued flowers obsess both men and bees),
Most living things ignore your tracery,
Ferns don't interact or set out to please,
As if they had that rare facility,
Preserving leaves untouched by mould or worm,
As their seed has, invisibility,
And nothing mars the beauty of their form.
Folk may wonder why - if they only knew,
That in fern's veins there runs a witches brew!

Alan Ogden

TREE-FERNS IN CULTIVATION IN VICTORIA, AUSTRALIA

Martin Rickard, Kyre Park, Tenbury Wells, Worcestershire. WR15 8RP

Given the existence of a good number of tree~ferns native to Australia I expected to find many in cultivation, pluis perhaps a few non-native species grown by specialists, I was not Jisappointed!

Travelling through (the suburbs of Melbourne tree-ferns were not rare in front gardens. *Dicksonia antarctica* was commonest but *Cyathea cooperi* pushed it close. I say *C.cooperi* but out of the window of a moving car, I must admit some plants could have been C.brownii! Even more embarassing is the difficulty I experienced separating these two species when I had ample time! It seems there is no real diagnostic character which separates them. I drove Chris Goudey mad continually asking him to explain his determinations. In the end he just said 'Take my word for it!' In truth *think* I can tell the difference but I don't fancy trying to put it down on paper - I'll leave that for others!

These suburban gardens were all very well. On the whole the plants looked good, even though the Melbourne climate is dry, the ferns seem unaffected by drought - attributed to El Nino. Of more interest are specialist collections and one specialist in particular - Chris Goudey who lives at Lara about 40 miles SW of Melbourne. I was very fortunate to stay 5 nights with Chris and his wife Loraine and had a lot of time to examine Chris's collection - I won't say ample time because I've come away with an awful lot of questions! His collection is partly inside his greenhouses (glasshouses or polythene tunnels), and partly in a shady corner of his garden.

In the greenhouses the collection is given excellent cultural conditions, warmth, shade and humidity. In some cases Chris is struggling to accomodate the larger specimens. Cyathea brownii long since penetrated the roof of his fifteen foot high fernery and still thrives like a sweep's brush poking six feet above the top! (Fig.1) On the whole, however, the inside ferns are smaller than the ones in the outdoor fernery. Not surprisingly Chris is not always sure of the correct name of some of the more obscure species and hybrids, and I was rarely in a position to help, or even confuse, him!

Figure. 1. *Cyathea brownii* escaping through the roof of Chris Goudey's fernery at Lara in Victoria.

Plants I noted in his collection in the greenhouses are as follows:
Cyathea:
australis - Australian native.
baileyiana - young plant with a well developed 'wig'.
brevipinnata - Lord Howe Island, can reproduce by stolons.
colensoi - the creeping tree-fern of New Zealand.
contaminans - tropical Malaysia.
cooperi x *robusta* - parentage guessed, but looks likely.
cooperi x *medullaris* - as above.
cooperi - cinnamom form - very attractive, could be a different species.
cooperi - Australian native
cooperi howeana - Lord Howe Island, fronds fleshy, related to *C.robert5iana*.
kermadecensis - trunk dark rachis scales conspicuous, distinctive.
leichhardtiana - spiny rachis, Australian native.
lunulata - Malaysian.
macarthuri - Lord Howe Island, underside can be glaucous like C.dealbata.
medullaris - New Zealand.
novacaledoniae - New Caledonia.
rebeccae - Queensland.
robertsiana - Trunk 1.5 inches in diameter, yet 6 feet tall! Incredible. (Fig.2)
robinsii - from Phillipines
robusta x *brownii* - another probable hybrid, looks likely to me.
species aff. *spinulosa* - not the same as my Nepalese spinulosa
species ex. New Caledonia - small species.
species ex Mt Gahavsuka Papua New Guinea
species ex. New Caledonia - large brown scales on glaucous stipe, a beauty.
vieillardii. woolsiana - Australian native.

Dicksonia:
baudonii- looks very like antarctica to me.
berteriana - Juan Fernandez Islands, very attractive.
brackenridgei - Fiji.
lanata - New Zealand.
lathomii - hybrid ex. Birmingham, UK by tissue culture.
species - ? ex New Caledonia
squarrosa - New Zealand.
sguarrosa x *antarctica* - Likely guess, ocurred in spore sowing.
thyrsopteroides - Juan Fernande2 Islands.
youngiae -Australian native, purplish scales.

Others:
Cibotium glaucum
Culcita dubia. Not really a culcita, needs a new genus.
straminea
Marattia attenuata
douglassii
fraxinea
fraxinea ex Zimbabwe
fraxinea var *salicina*
howeana salicina ex New Zealand
tafeensis - Papua New Guinea
All marattias are very similar, to me, all are attractive with dark green fronds.

In the outdoor fernery:

This area is shaded by quite a good stand of trees and it is surrounded by a windbreak up to about 2 metres, but the wind still gets in and the pervading dry atmosphere of the Lara area is not terribly helpful. Quite a lot of damage has been suffered by the extremities of some of the larger fronds. Chris has a sprinkler system in this area - as he has throughout most of the nursery.

Minimum temperature, over several years, is 30°C, this summer the temperature crept above 40°C - hence the burning of some fronds.

Cyathea;
australis
australis subsp. *norfolkiensi* 5 - Norfolk Island form.
brownii - huge, cooperi look-a-like.
capensis - slender trunk, South Africa.
cooperi - Australian native.
cooperi - cinnamom form.
cunninghamii - slender trunked Australian native.
dealbata - New Zealand.
kermadecensis.
leichhardtiana.
macarthuri.
marcesens - hybrid between cunninghamii and australis, appearance variable.
medullaris - New Zealand.
medullaris x *cooperl*.
robusta x *brownii*.
robusta - stipe bases sub-glaucous. 2 the most handsome tree-fern hardy in Australia.
smithii - New Zealand.
species aff. *brownii* ex Papua New Guinea. Stunningly beautiful.
species aff. *spinulosa*. species unknown.
tomentosissima. Papua New Guinea.
woolsiana.

A total of 35 taxa of *Cyathea*, plus 1 am sure Chris must have *C. dregei* and *C.albifrons*. = 37.

Dicksonia:
antarctica
fibrosa
herbertiana
sellowiana - not convinced this is the same as my plants.
squarrosa

Others - almost tree-ferns!
Angiopteris species ex Phillipines
Cibotium dubia
glaucum
regale
schiedii
Todea barbara
papuana

In all 16 taxa of 'almost tree-ferns'. Total a collection of 65 tree-ferns etc. An incredible collection. Other local growers have superb collections, for example Les Vulcz who lives in the Otways, 'the home of tree-ferns' (my name!), his collection is wonderful but probably includes nothing Chris doesn't grow - watch this space for a reply from Les! Les's ferns are largely grown in his front yard. This is fairly open but he has planted a few windbreaking trees. Even

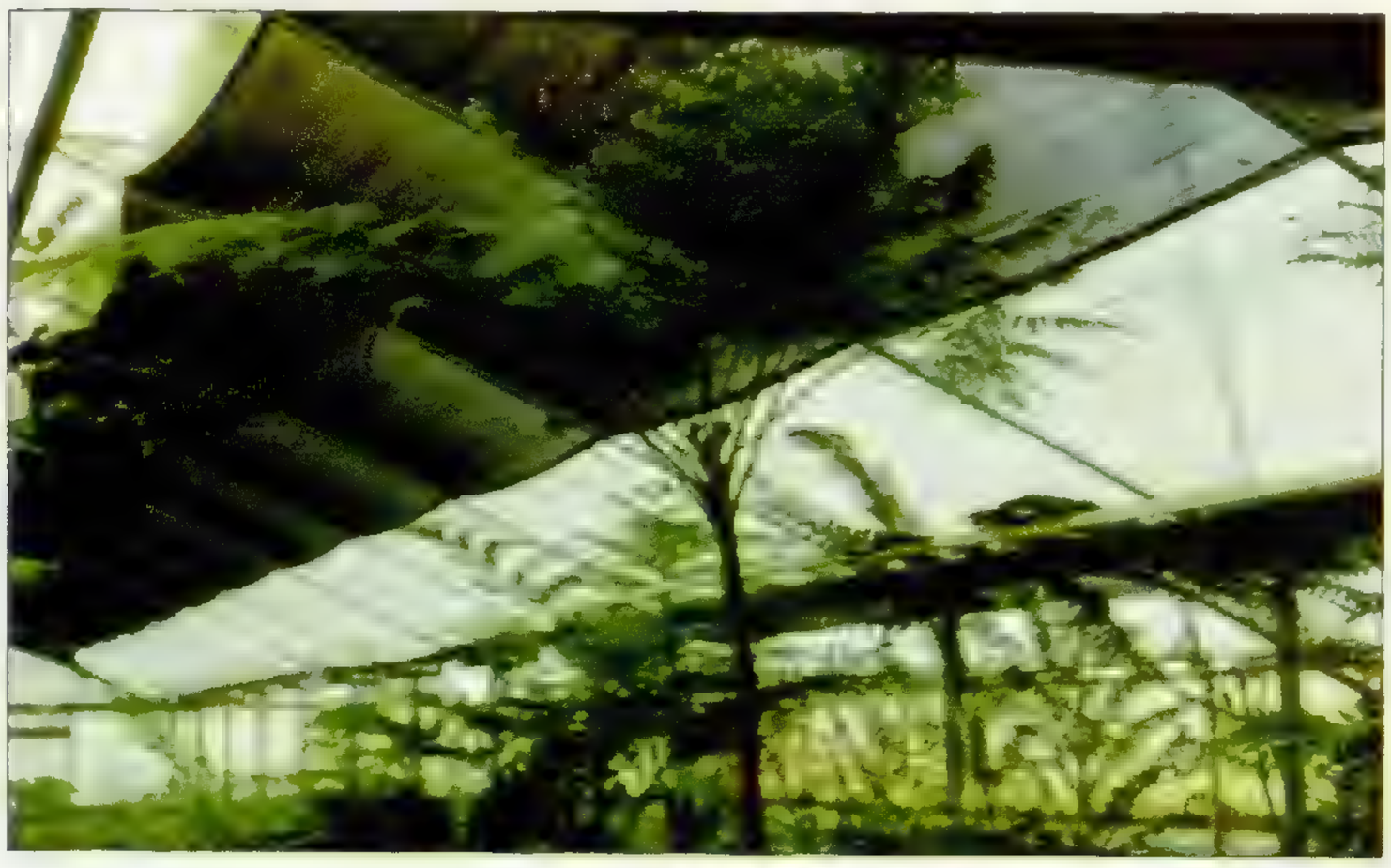

Figure. 2. *Cyathea robertsiana* in one of Chris Goudey's fern houses.

Figure. 3. *Cyathea sp.* from Papua New Guinea in Les vulcz's front yard (Photo by Les Vulcz)

Fig. 4. Barry White inspecting Dorothy Forte's *Cyathea robusta* for spore.

Fig. 5. Cysthea medullaris in Dorothy Forte's dahlia patch!

after only a few years many plants are magnificent specimens. My favourites would be the New Guinean species with affinities to *C.brownii* - see photographs, the scales are pale brown (Fig. 3). Les calls this 'Front yard 1', there is also a 'Front yard 2' and I may be mistaken which one is from New Guinea. One or two specimens of *Cyathea medullaris* are huge after only, I believe, 7 years - the trunks are about 7 feet tall and a foot in diameter with fronds perhaps 8 feet long magnificent! Les and his wife Rosemary run a specialist fern nursery like Chris and Loraine, but Les also salvages tree-ferns from the bush, of which more anon.

While I was staying with Chris I saw several other fern collections. All fantastic by our standards. The lath house at Ripponlea in Melbourne, see *Pteridologist*, 1988, is wonderful, with Chris's help I recorded 17 species of tree-fern and almost tree-ferns - including a 6 foot tall trunked *C.robertsiana*. Also in Melbourne the Potanic Gardens are well worth a visit, with many outstanding specimens (watch out for the flying foxes!). Chris Goudey, along with another local PPS member Parry White, also took me to the garden of Dorothy Forte about 80 miles east of Melbourne. Again I don't think she had any tree-ferns additional to Chris's list but she did have the best *C.robusta* in any collection - it was sporing (Fig.4)! Dorothy also had a magnificent 5 or 6 foot tall *C. medullaris* growing out of her remely colourfull dahlia patch, not a combination I had expected (Fig 5)!

In Britain, we don't realise just how difficult it is to harvest fresh spore each year. These *C..robusta* were introduced into Australia many years ago by Chris when he collected spore on Lord Howe Island. The spore germinated and plants were widely distributed, but then you have to wait years before these new plants themselves produce spore. The result is no new *C.robusta* came into circulation. The significance of the spore on Dorothy's plant is that now Chris has a fresh supply of spore and can get more material in the pipeline. Another problem for the spore collector is the difficulty in reaching the sporing fronds! Chris tells me that it is not unheard of for spore collectors to use shotguns to remove sporing fronds from the largest specimens! Certainly during my visit, when I saw many plants of *C.cunninghamii* I never once had the opportunity to collect spore - I know, I was perpetually on the look out! One grower has layered a very tall plant of *C.cumminzhamii* in his garden in the hope of fooling it into sporing close to ground level, I hope he succeeds! Another difficulty with collecting tree-fern spore is collecting it at the right time of year, I know this is obvious but is it obvious that at least one species sheds its spores in spring! This is the New Zealand species *Dicksonia lanata*. I examined dozens of plants when in the Waipoua Forest with Barbara Croxall. Barbara warned me I wouldn't find ripe spore and she was right (of course!). The sporing fronds are produced in autumn but they ripen overwinter. In February, their autumn, I found plenty of dying fronds covered with shed sporangia as well as young fronds covered with immature sporangia, but no ripe spore. But I digress, this was New Zealand and not Australia as defined by the title of this note.

I am sure there are many other excellent collections of tree-ferns elsewhere in Australia but I think I have seen some of the best in victoria thanks to the kindness of Chris and Loraine Goudey and Les and Rosemary Vulcz.

NOTICE OF NEW FERN BOOK

The Ferns and Allied Plants of New England by Alice F. Tryon and Robbin C. Moran. Massachusetts Audubon Society 1997. ISBN 0 932691 23 4

US $49.95 + postage from Massachusetts Audubon Society, 208 South Great Road, Lincoln, MA 01773, USA. E-mail: hprees@massaudubon.org

A richly illustrated hard-cover reference guide of 325 pages, containing keys, global and local distribution maps, 86 new photographs and drawings. A special section includes s.e.m. photographs of spores.

HARDY NORTH-AMERICAN FERNS IN BRITAIN: THEN AND NOW

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In the early summer of 1997 and with the approval of the BPS Committee, we embarked on a *Survey of the Hardy North-American Ferns in British Gardens*. Readers of the *Pteridologist* may recall seeing a flyer about this in the 1997 issue in which we sought information from all members of the Society who are growing ferns from North America. We are still receiving responses and expect eventually to have data and advice from over 50 British gardens, ranging from the south of England to the north of Scotland. The main purpose of the Survey is horticultural: to establish, as we approach the millenium, exactly which species and varieties of North-American ferns actually are being grown in British gardens and how widely; also their growth requirements, problems in cultivation, and aesthetic merits. For the future it highlights which other ferns from the United States and Canada might also be candidates for British gardens. We have been very conscious in making this Survey, of the pioneering work of Rush (1984) who included many North-American species in *A Guide to Hardy Ferns* which was the first of the BPS Special Publication Series.

There is also an ecological dimension concerning the factors that regulate the naturalization of introduced species of plants, since the growing of hardy North-American ferns in Britain goes back 370 years. According to Smith (1877), *Cystopteris bulbifera* and *Adiantum pedatum* were brought to England in 1628 by John Tradescant the Younger. The former species, Smith comments, 'should be in every hardy collection, flourishing without any care and attention, and rapidly spreading itself both by its bulbils and seeds. It is really a very pretty fern, and one that eventually will be naturalized and found wild throughout England.' Whatever Smith meant by eventually is evidently some time span greater than 120 years, for *C. bulbifera* has so far not fulfilled his 1877 prediction; nor has *A. pedatum*.

Other early introductions from North America were *Onoclea sensibilis* and *Asplenium rhizophyllum* which Smith wrote were known in England as early as 1680 and 1699 respectively, and *Aspidium (Polystichum) achrostichoides* in 1822. At least the first of these has naturalized in Britain to some extent and and is one of the six North-American species mentioned by Page (1982) in a list of the alien ferns in the British flora.

In the mid-to-late 19th Century at the height of the Victorian fern craze, various hardy North-American ferns were being propagated by British nurserymen. But the number of

Figure. 1: Left to right: *Onoclea sensibilis, Phegopteris hexagonoptera* and *Lygodium palmatum* in H. Stansfield's *Catalogue of Hardy Ferns*, ca. 1870 (BPS facsimile reprint, 1979).

different species seems to have been limited. For example, Stansfield's *Catalogue No. 9 of Hardy Ferns* from the 1870s (available as an undated facsimile reprint from the BPS) contains only 13 North-American species among the 517 taxa listed. Most of these 13 are available today from suppliers listed in the Royal Horticultural Society's *Plantfinder* 1997-98, notable exceptions being *Cryptogramma achrostichoides* and *Woodwardia virginica*. Fig 1 reproduces illustrations of hardy North-American ferns from the Stansfield catalogue.

Moving to the recent past, our *Survey* emerged from the discussions at the BPS Symposia on *Fern Hardiness* at Kyre Park in January 1996 and on *Foreign Hardy Ferns of North America* at Warwick in April 1997. We first drew up a *Provisional Checklist of Hardy North American Ferns*, since we found that many growers might know that a fern in their collection was foreign without necessarily being sure of its provenance. *The Provisional Checklist* was based on the species described in the authoritative *Flora of North America North of Mexico, Vol. 2 Pteridophytes and Gymnosperms* (Flora of North America Editorial Committee, 1993). To avoid excessive length, we carefully selected only about one-third of the total species potentially available. For example, we omitted all of the 35 species of North American *Botrychium* on grounds both of horticultural inaccessibility and probable lack of gardening appeal. We also excluded the sub-tropical and tropical taxa and the approximately 24 species of North-American fern that are in the British flora. After these editings we were left with a list of 102 species of North-American ferns for respondants to browse through, but with the proviso that extra names could be added as required.

In brief, the *Survey* has revealed that about 60 species of ferns from the United States and Canada are currently grown in the gardens of the responding BPS members, generally with few problems. However about one-half of these 60 species are in 3 or fewer gardens. Those in 10 or more gardens are in alphabetical order: *Adiantum aleuticum, Adiantum pedatum, Cyrtomium fortunei, Cystopteris bulbifera, Dryopteris goldiana, Dryopteris marginalis, Onoclea sensibilis, Matteuccia struthiopteris, Osmunda cinnamomea, Polypodium glycyrrhiza, Polypodium glycyrrhiza* 'Longicaudatum', *Polypodium scouleri, Polystichum achrostichoides, Polystichum andersonii, Polystichum braunii* and *Polystichum munitum*. All of these are currently available from commercial sources in Britain, some very widely. For example, the RHS Plantfinder 1997-98 lists 29 suppliers of *Adiantum pedatum*.

Other sources of North-American ferns are the spore lists of the BPS and of the American Fern Society which in recent years have included such attractive species (not commercially available in Britain), as *Demstaedtia punctilobula, Diplazium (Athyrium) pycnocarpon, Phegopteris hexagonoptera, Polypodium amorphum* and *Woodwardia virginica*. The potential for introducing hardy North-American ferns into British gardens is thus far from exhausted, with 40% of the checklisted North-American fern species apparently nowhere cultivated in the UK; and to these should be added the cultivars, such as the crested varieties, which exist for some species. Thus there is still much scope for British fernerys to be enriched with attractive and challenging species from across the Atlantic Ocean. So far only 4 of the North-American fern species have been given the RHS Award of Garden Merit, but this number should increase as new species are brought in.

We now have a large amount of data and species descriptions to assemble, and hope to have a full and illustrated text ready for publication by the end of 1998, either as a BPS Special Publication or elsewhere. Meanwhile we thank all those who reponded so generously to our request for information.

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Blechnums in New Zealand

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The Blechnaceae is predominantly a family of the Southern Hemisphere so I shouldn't have been surprised to find a number of *Blechnum* species on the many walks I took in the New Zealand bush during my seven week trip, in contrast to Europe's one. What did surprise me was the number of species and how common many of them are. According to Brownsey & Smith-Dodsworth (1989), New Zealand has eighteen species of which eleven are endemic. They vary in size and habit with several being quite spectacular providing the keen photographer with exciting challenges. Of the eighteen species I saw at least eleven.

Like our own *Blechnum spicant* (L.) Roth most tend to prefer damp, shady situations, some damper and darker than others, whilst some seemed to be able to tolerate full sunlight.

Blechnum colensoi (Hook. f.) Wakef., (Fig. 1) one of the largest species and found only in New Zealand, is known as the waterfall fern because of its want to grow in dark, damp places, particularly near waterfalls. On the Mt. Cargill track near Dunedin, a colony of large, quite un-*Blechnum*-like (to the European observer), dark green, shiny, pendant fronds hung on the steep banks of a stream tumbling down the mountain side, water dripping off the well-pronounced drip-tips of its pinnae. The fertile pinnae, however, give the genus away with the long, thin, straggling pinnae, often longer than those of the sterile fronds, recalling a rather depauperate ostrich feather boa!

Also common, in the darker parts of many damp forests, both lowland and montane, is *Blechnum fluviatile* (R. Br.) Salomon, (Fig. 2) where it particularly enjoys the damp habitat provided by the banks at the side of trackways down which water drains from the slopes above. This species with its erect rhizome, flattish rosette of leaves and nearly round pinnae is easily recognised by the presence of very prominent scales on the upper surface of the pinnae, especially along the midrib, as well as on the stipe and rachis. The fertile fronds are also distinct with very narrow, short pinnae which stand almost vertical and parallel to the rachis, the fronds themselves standing very erect amidst the near prostrate sterile leaves. The Maori utilised a number of ferns for a variety of purposes and they chewed the leaves of *B. fluviatile* to alleviate sore mouths and tongues, whilst a few fronds attached to a post were said to ward off evil spirits (Crowe, 1994).

Another species also commonly found in damp, shady situations similar to those enjoyed by *B. colensoi* and *B. fluviatile*, in fact frequently found with them, is *Blechnum chambersii* Tindale. (Fig. 3). Like *B. fluviatile* its fronds are produced in rosettes but they are more arched than those of the latter species. Their pinnae for the upper two thirds of the frond are oblong with a characteristic tendency to curve towards the frond apex, whilst towards the leaf base they become progressively shorter. The Maori ate this fern after steaming the leaves in their cooking pits. In Australia where it is also found, it is known to have insecticidal properties (Crowe, 1994).

Blechnums seen in drier and often more open canopied forests, included *B. filiforme* (Cunn.) Ettingsh., *B. penna-marina* (Poiret) Kuhn, *Bl. discolor* (Forst. f.) Keys and *B. fraseri* (Cunn.) Luerssen. *B. filiforme* (Fig. 4) is unique amongst the blechnums of New Zealand in two respects: it has two habit forms, creeping and climbing, and its vegetative fronds exhibit a limited polymorphism. Initially it creeps across the forest floor, even over fallen branches and rocks, sometimes for considerable distances, producing tangled masses amongst other ground flora. The delicate, near linear juvenile fronds, approximately 15 cm in length, have pinnae which are roundish to oblong, round ended or tapering and markedly toothed. They belie the common name for the Blechnaceae, the 'hard ferns' with its thin leaves. Upon contact with the base of a suitable host tree the fern begins to climb by its rhizome reaching as high as the base of the canopy, which can be 30 or more metres high, and frequently forms dense festoons of drooping fronds. According to Brownsey and Smith-Dodsworth it is one of the few high climbing ferns in New Zealand. Once it starts to climb it begins to produce its adult vegetative leaves which are quite distinct from the juvenile form in size and shape. Usually 30 to nearly 100 cm long, they are narrowly elliptic to ovate, the narrowly triangular pinnae having tapering apices and

Figure 1: *Blechnum colensoi* in the Fernery, Pukekura Park, New Plymouth.

Figure 2: *Blechnum Fluviatile* in Makarora Forest, Hwyle, South Island.

Figure 3: *Blechnum chambersii* on the Hangi Track near Rautua.

Figure 4: *Blechnum filiforme* in dry forest in Kerikeri Basin, Northland.

toothed margins. The fertile fronds are only produced once the fern has reached the upper regions of the host tree and have long, extremely thin and whispy pinnae, which are probably responsible for the common name, thread fern.

Blechnum penna-marina is frequently seen in gardens of fern-growing enthusiasts in Britain, particularly in rockeries or forming borders to beds, its far-creeping rhizome with closely-produced fronds forming a good low-growing ground-cover plant. It is also desired because the profuse deep purple-brown, erect fertile fronds provide an attractive colour combination with the dark-green to bronze green and often near prostrate vegetative leaves. I several times found *B. penna* marina growing in open, damp areas of kanuka (*Leptospernum ericoides*) scrub and at the edges of forests, and frequently seeming to prefer the cool conditions provided by high altitude, such as at the Dobson Memorial Track near Arthur's Pass Village (Fig. 6). These apparent habitat preferences surprised me in view of the kinds of situations in which I have seen it growing in British gardens, so I was reassured when I also found it growing in a sun-facing wall in Fox Glacier village.

It is an unforgettable sight to see a forest floor dominated by *Blechnum discolor* with its handsome, near perfect shuttlecock, especially in the spring when the bright green new fronds form an inner shuttlecock inside the darker green, leathery fronds of the previous season. The fronds can be up to 120 cm in length and 16 cm wide. Evolutionists tell us that the Blechnaceae is a family currently evolving a tree habit and certainly the tendency to develop a trunk can be seen in older specimens in this species. They spread by stolons from these trunks to form extensive, almost ground cover populations in some forests. Of the *Blechnum* species that I saw in New Zealand *B. discolor* certainly had the most elegant and interesting fertile fronds. The upper pinnae are fertile for all their length, but descending the frond the basal portion of each pinna becomes increasingly sterile and laminate, with a corresponding reduction in the portion that is fertile, so that the lowermost pinnae can be fully sterile. They develop in the centre of the crown after the vegetative fronds; slightly taller, stiff, linear and nearly erect they, themselves, are arranged in a near shuttle cock. It is difficult to describe, but the result is a most elegant frond, bright green initially but with the fertile portions turning reddish brown as the spores mature. Maori warriors would use the fronds of this wide-spread and common fern by breaking off and turning them upwards to reveal their contrasting grey-green undersides in order to mark a trail for a war party (Riley, 1983). Reported apparently hardy in Norway (Rush, 1984) it would be interesting to know if anyone has subsequently found it to be so in Britain; it would be a most attractive specimen plant in a garden. Brownsey & Smith-Dodsworth (1989) recommend a rich, light soil under light to medium shade.

Of course, the *Blechnum* species most well known in the New Zealand flora because it has already evolved an, albeit miniature, tree fern habit, is *Blechnum fraseri*. Although I only saw two of these plants in the Kauri forest of Wiapoua in the north east of the North Island, they are locally common in both the North and South Islands. It is an intriguing plant and not at all *Blechnum*-like for its leaves are bipinnate rather than pinnate, and its fertile fronds are similar to the sterile ones with only slightly thinner secondary pinnae; indeed some workers are of the opinion that this plant does not belong in the genus *Blechnum* because of these atypical features (Brownsey and Smith Dodsworth, 1989). A characteristic which makes identification easy in cases of doubt is the jagged wing of the rachis found in both types of frond.

Two of the most ubiquitous and most spectacular ferns in New Zealand, at both low and high altitudes, are those curiously named (or rather unnamed!) *Blechnum* sp. 1 (kiokio) and *Blechnum* sp. 2 (mountain kiokio)! Wherever there is freshly opened ground, open to the sun or lightly shaded, preferably on a bank at the side of a road or in a forest, dry or damp, these species readily establish themselves and form a dense cover of large, elegantly pendant fronds which, in kiokio, can reach a length of 320 cm in some conditions. In the spring, in more exposed situations these colonies are ablaze with the pink through to red to reddish brown colour of the new fronds amongst the bright green of those of the previous year. Especially in the montane areas of the west coast of the Southern Island where the mountain kiokio often predominates, the colour was at its richest. The crisping of the pinna margins was also at its greatest and most attractive in such conditions. Imagine a roadside bank several miles long dressed with such

fronds from the ground to a height of three to four feet! These two ferns hybridise readily where they meet and in such situations it was not unusual to find fronds where one half of the leaf (or close to it) had fertile pinnae and the other side, sterile pinnae. Whether or not this is a result of the hybridisation process I do not know. The common name, palm leaf fern, conjures up well the appearance of the leaves of these ferns; which species can be identified with certainty only by looking at the base of the fronds.

Figure 5: *Blechum vulcanicum* with *Lycopodium volubile* near Lake Rotoiti, Nelson lakes District, South Island.

At first glance the fronds of *B. vulcanicum* (Blume) Kuhn, (Fig. 5) with their hanging habit and penchant for banks on bush margins and roadside cuttings, could be mistaken by the uninitiated for young or small *Blechnum* sp. 2. However, a closer look reveals that the tips of the fronds do not have a distinct terminal pinna, and a closer look still reveals the tell-tale, unique lowermost pair of dorsally projecting, distinctly sickle shaped pinnae of both sterile and fertile fronds. Like the kiokios, the new fronds can develop a reddish tinge in conditions or bright light. In all three species the colour is due to flavonoid pigments which help protect the fronds from the damaging energy of excessive light. *B. vulcanicum* is an attractive fern and on the river bank at Thunder Creek falls off Highway 6, the Makarora to Haast Road in the South Island, it was happily enduring water trickling over its fronds.

Finally, in a different habitat altogether, a cluster of bright green fronds, crouching under an outcropping rock and rather tough looking and slightly succulent to the feel, attracted my attention as we walked along the cliff path at Cape Foulwind, on the northern west coast of the South Island, to see the famous colony of fur seals. The considerably shorter fertile fronds just visible amongst the sterile fronds confirmed that it was *Blechnum banksii* (Hook.f.) Diels. Further south on the coast at the famous pancake rocks of Punakaiki we saw large colonies of this fern, alongside and intermingled with the duller green and even more succulent leaves of *Asplenium vbtusatum* subsp. *obtusatum*. Both these species appear to prefer rocky, cliff-like habitats close to the sea, even within the reach of sea spray. Do they find less competition here or are they refugees from salt-intolerant herbivores?

If at all possible New Zealand is a must for any field fern enthusiast. Only rarely in Britain do we see such profusions of ferns as one can see in New Zealand where it is not only monospecific stands but also multispecific communities of ferns which can locally dominate the herbaceous floras of forests and scrublands. One only has to take one of the many recommended walks, a short one will suffice, in the multiplicity of national parks and scenic reserves of New Zealand to enjoy such sights. You do not have to be a fit long-distance walker nor a mountain goat; wherever you are, a brief excursion will show you much - and blechnums are almost certain to be there!

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Figure 6: *Blechnum penna-marina* on the Dobson Memorial Track, Arthur's Pass.

Figure 7: *Blechnum discolor* in the forest near Milford Sound.

Figure 8: *Blechnum fraseri* in Waipona forest, Northland.

Figure 9: *Blechnum* sp. 2 (Mountain Kokio) near Fountain Falls, Makarova Forest, South Island

POLYSTICHUM X DYCEI: A NEW ORNAMENTAL FERN HYBRID FOR THE GARDEN

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INTRODUCTION

For the past forty years, following the publication of Manton's now classic work *Problems of Cytology and Evolution in the Pteridophyta* (1950), the evolution of various polyploid species-complexes in both temperate and tropical fern groups has been studied by means of the analysis of the pairing behaviour of the chromosomes at meiosis in both naturally occurring and experimentally produced hybrids. The first hybrids deliberately synthesized for this purpose were made in the genus *Dryopteris* (see Manton 1950, pp. 48-49). Subsequently similar hybrids were made in other genera, and the synthesis of hybrids of known origin soon became a firmly established tool in the study of fern cytogenetics at Leeds (for example, see Walker 1955, Shivas 1961, Walker 1958). The techniques for the production of artificial fern hybrids have already been described in detail by Lovis (1968).

In most of the early work on fern hybridization efforts were concentrated on producing synthetic hybrids between a particular tetraploid species under investigation and the diploid species suspected on morphological grounds of being involved in its ancestry. One of the earliest hybrids of this type was a cross between *Polystichum aculeatum* (L.) Roth from northern Italy and *P. setiferum* (Forsk.) Woynar from Dartmouth, Devon made by Professor Manton in the mid-1940s (Manton 1950, p. 154). Such hybrids proved easy to produce and gave the now well established pattern of 'n' bivalent and 'n' univalent chromosomes at meiosis. It was only subsequently that efforts were directed to the possible synthesis of 'wide hybrids', i.e. hybrids between unrelated or distantly related species, in order to prove whether a given tetraploid was auto- or allopolyploid. The first 'wide hybrid' to be produced at Leeds was a cross between *Phyllitis hybrida* (Milde) C. Chr. (an allotetraploid species arising from *Ceterach officinarum* DC. subsp. *bivalens* D.E. Meyer and *Phyllitis sagittata* (DC.) Guinea & Heywood) and *Asplenium macedonicum* Kümmerle (Emmott 1964). Since then many similar, if less spectacular, hybrids have been synthesized at Leeds, particularly in the genus *Asplenium*. Many of them have been of very attractive appearance (for example, *Asplenium onopteris* x *A. majoricum* (Sleep 1967), *Pleurosorus hispanicus* x *A. petrarchae* subsp. *bivalens* (Lovis 1973), *A. kobayashii* x *A. adiantum-nigrum* (Sleep 1980, 1983), *A. majoricum* x *A. billotii* (Sleep 1983) but such hybrids, since they are sterile and produce only abortive spores, cannot be reproduced and although of considerable academic interest, are of no horticultural value.

Polystichum is a genus which produces hybrids easily, both under laboratory conditions and in the wild. For example, all the six theoretically possible hybrids between the four European species of *Polystichum* are known in nature. These are:

P. lonchitis x P. setiferum	=	**P. x lonchitiforme* (Halácsy) Becherer
P. lonchitis x P. aculeatum	=	**P. x illyricum* (Borbás) Hahne
P. lonchitis x P. braunii	=	*P. x meyeri* Sleep & Reichstein
P. setiferum x P. aculeatum	=	**P. x bicknellii* (Christ) Hahne
P. setiferum x P. braunii	=	*P.* x *wirtgeni* Hahne
P. aculeatum x *P. braunii*	=	*P.* x *luerssenii* (Dörfler) Hahne

The three hybrids marked by an asterisk are all known to occur in the British Isles.

Over twenty naturally occurring *Polystichum* hybrids have already been recorded from the Japanese Flora (Nakaike 1975) and wild hybrids can similarly be expected to occur elsewhere. Under laboratory conditions there seem also to be few barriers to hybridization in *Polystichum*. In my experience it has been very easy to produce even the strangest crosses, combining species

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†Anne Sleep died on 22nd June, 1993 (Obituary: Bulletin 4(4), 176-177, 1993)
The paper was prepared for publication by Mary Gibby

from different continents and successfully incorporating taxa from different sections of the genus. Again, because of their sterility, these hybrids are of limited horticultural interest. Although well-established hybrid plants do sometimes produce secondary crowns which may be separated by division. The wide hybrids in particular are necessarily limited in number and, despite their attractiveness, are not generally available for distribution to the fern grower.

However, some species of *Polystichum*, for example, *P. proliferum* (R.Br.) Presl, *P. andersonii* Hopkins, *P. craspedosorum* (Maxim.) Diels, are known to reproduce vegetatively by means of proliferous buds borne at or near the frond tips. A hybrid with this character would be, irrespective of its abortive spores, immediately capable of reproducing itself. Some years ago, as part of a hybridization programme involving different *Polystichum* species from Europe, North America and Australia, I raised two series of hybrids, each incorporating as one parent a species which reproduces by means of proliferous buds. This character was found to persist in the resultant hybrids, which are easy to propagate and therefore of particular interest to fern growers.

Seven different hybrid combinations reproducing by such buds have been synthesized, four of them incorporating an Australian species, *P. proliferum*, a taxon of ornamental value itself.

Synthesized hybrids involving *P. proliferum*

P. proliferum ♀ Australia	x	*P. braunii* ♂ Europe		4x
P. aculeatum ♀ Europe	x	*P. proliferum* ♂ Australia		4x
P. proliferum ♀ Australia	x	*P. setiferum* ♂ Europe		3x
P. proliferum ♀ Australia	x	*P. acrostichoides* ♂ U.S.A.		3x

***P. proliferum* (R.Br.) Presl**

Polystichum proliferum resembles our native *P. setiferum*. The fronds are very dark green and bear, on the lower surface of the lamina just below the frond tips, several small, scaly, proliferous buds. Pot-grown fronds are 60cm or more in length, fully bipinnate and with a long (up to 20cm) stipe. This bears many very long, narrow, dark-coloured scales at its base, while fine, chestnut-coloured scales clothe the upper part of the stipe as well as the rachis. The frond has long basal pinnae which are themselves pinnate (as in *P. setiferum*), and is lax and open in appearance with space between the insertion of both pinnae and pinnules. The pinnae are long and spreading and bear 9-12 pairs of discrete, narrow, very shortly stalked *aculeatum*-like pinnules which are sharply pointed at the tip. The proximal acroscopic and basiscopic pinnules are approximately equal in size and each is cut proximally to form a single obovate segment which stands away from the rest of the pinnule like a thumb. Sori are median in position. The indusia are orbicular with a central group of thickened cells and bearing on the margin numerous club-shaped glands. *Polystichum proliferum* occurs from south-eastern Queensland through the coastal areas and table-land of New South Wales to Victoria and Tasmania. It grows in a variety of habitats: wet or dry sclerophyll (*Eucalyptus*) forest, on hillsides or in subtropical or temperate rain forest. It is particularly common in Tasmania, where it forms a dominant part of the fern flora.

The hybrid *P. proliferum* x *P. braunii*

In the summer of 1963 three hybrids (AS/629(i) and (ii) and AS/675) were made at Leeds between *P. proliferum* from Wentworth Falls, in the Blue Mountains, New South Wales, Australia and *P. braunii* from the Val d'Antabbia, Canton Ticino, Switzerland. *Polystichum*

Figure 1. Holotype of *Polystichum* x *dycei* Sleep, hybr. nov. AS/629(ii).

proliferum was used as the female parent. Two of these hybrids grew outside in a sunny, open position at the University of Leeds Botany Department's Experimental Garden for many years but, following staff changes in 1979, both these very fine plants were lost. Fortunately proliferous buds taken from the original hybrids had been potted up in 1977, and several plants were raised from such buds. One of the three original hybrids still survives in Zurich Botanic Garden, together with its progeny. The hybrid is a distinctive fern, which combines features of both its parents. *Polystichum proliferum* has been described above. The other parent, *P. braunii*, also not native to Britain, is a common woodland fern in central and eastern Europe. It shows a disrupted circum-polar distribution in the boreal regions of the northern hemisphere. where it occupies three major areas: eastern Asia, Europe and eastern North America. It also occurs sporadically in the coastal areas of north-western America. *Polystichum braunii* is completely hardy in the British Isles and is a handsome species for either a cold greenhouse or outdoor cultivation. It is bright- or yellowish-green in colour, smaller than the hybrid (fronds 60-l00cm when grown outside) and of soft, lax appearance. The frond narrows markedly towards the base, the basal pinnae being small and pinnate. The scales are pale brown, mostly broad and papery at the base of the stipe, filiform elsewhere. Both upper and lower surfaces of the lamina bear fine, soft hairs. The frond is bipinnate and the regular pinnules are squarish in shape, only scarcely auricled, and with a smooth or slightly serrate margin.

The hybrid combines the dissection and proliferous buds of *P. proliferum* with the colour, frond shape and scaliness of the *P. braunii* parent. The conspicuous, glossy, dark-brown scales on the croziers and at the base of the stipe are a characteristic feature of the hybrid, the dark colour coming from the *P. proliferum* parent and the shape from *P. braunii*. Higher up the stipe the scales become narrower, with a dark central stripe and pale brown edges, while on the rachis and mid-ribs they are pale brown and filiform.

Polystichum **x** *dycei* Sleep, hybr. nov. = *P. proliferum* (R.Br.) Presl x *P. braunii* (Spenner) Fée Hybrida hortensis e *Polysticho prolifero* Australiae et *P. braunii* Helvetiae arte facta, proprietatibus parentum immixtis. Planta valde squamosa, in rache costisque paleis pallide brunneis filiformibus vestita, ad basim stipitis squamis numerosis subulatis nitidis atrocastaneis usque ad 2.5cm longis obsita. Frondes bipinnatae pinnulis basalibus ipsis pinnatis, l-3 bulbillos superficiei abaxiali insidentes versus apices ferentes. Pinnae pinnulis proximalibus acroscopicis et basiscopicis fere aequimagnis et ita incisis ut segmentum proximale pinnulae cuiusque ad instar pollicis exstet. Chromosomata sporophyti 2n = 164. Meiosis irregularis. Sporae abortivae.

Holotypus: AS/629(ii), 30 September 1965. Synthetic hybrid crossed 27 June 1962 and raised at the University of Leeds from:

♀***P. proliferum***, Wentworth Falls, Blue Mountains, N.S.W., Australia. No. P.8451. Leg. P. Messmer, 16.12.1962, and

♂***P. braunii***, Val d'Antabbia, north-west of Locarno, Canton Ticino, Switzerland, stock plant at Leeds, No. 40/60, originally collected by T. Reichstein (Figure 1).

Holotype **BM**, isotypes **B**, **E**, **K**, **Z**.

Progeny raised from buds from AS/629ii (TYPUS) are now in cultivation at Leeds. Two further hybrids were raised; AS/629i was sent to Zürich, under number TR 1752 and AS/675. Both originated from the same parental stocks. Progeny of these latter two (derived from the proliferating buds), are in cultivation at Chelsea Physic Garden, London and Royal Botanic Gardens, Kew. Further progeny (but of unknown number) are at Kyre Park.

It is my pleasure to name this hybrid after J. W. Dyce, in acknowledgement of his keen interest in the genus *Polystichum* and his study of its many varieties.

Polystichum* x *dycei: The synthesized fern hybrid combines attributes from both its parents, *P. proliferum* and *P. braunii*. Rhizome erect, with fronds arising in the form of a shuttlecock. Young croziers covered in glossy, dark-brown scales. Mature fronds bright-green in colour, long and narrow, up to 60cm in length when pot-grown but attaining l00cm or more when cultivated outside, and characteristically bearing 1 to 3 scaly bulbils on the abaxial (lower) surface of the lamina just below the frond tip. Stipes l5cm or more in length, very scaly. A distinctive feature is the presence, at the base of the stipe, of long (up to 2.5cm), glossy, dark chestnut-brown

subulate scales. Some of these scales have a pale brown margins and, further up the stipe, the deep brown centre gradually lessens so that on the rachis and costae the scales are a uniform pale brown. Blade bipinnate, narrowing slightly to the base, with the basal pinnae fully pinnate as in *P. proliferum* and *P. setiferum*. Pinnae long and narrow with pointed tips, those towards the upper part of the frond equalling the middle pinnae in length, and giving the frond a rather 'top-heavy' appearance. Each pinna is cut to the mid-rib to form 10-14 pairs of shortly-stalked, softly aristate, discrete pinnules, each bearing a small auricle on the proximal acroscopic side. At the base of each pinna the proximal pair of pinnules are approximately equal in size, with each deeply cut proximally to form, on the upper side, a discrete segment which stands away from the rest of the pinnule like a thumb. This feature is inherited from the ***P. proliferum*** parent. Sori 5-8 per pinnule, median in position, with a brown, orbicular indusium. Spores abortive. Chromosome number 2n = 164. Tetraploid. Meiosis irregular.

This description relates to pot-grown specimens. Garden-grown plants can be expected to be larger in size and with a more deeply cut frond which becomes tripinnatisect.

Footnote

Of a pair of pinnules, those

Proximal:	nearest to the axis.
Distal:	remote from the place of attachment.
Acroscopic:	facing, or directed towards, the apex (of a frond).
Basiscopic:	facing away from the apex, i.e. towards the base (of a frond).

Propagation from buds

Propagation from buds can take from several months to more than a year, and young plantlets will take from two to three years to become mature garden specimens. The method of propagation described here can be adapted to any bulbil-forming fern. Bud-bearing frond tips are removed from the mature plant with a pair of scissors, and the surrounding pinnae and pinnules are carefully trimmed off so that a single bud (or bulbil) is left sitting on about 1cm of stripped rachis on either side. Attached pieces of pinna are undesirable, as they are likely to rot and cause fungal contamination. The buds (two or three to a pot) are carefully spaced out on the surface of the moist compost and are anchored in position by means of two half paper-clips, one over the rachis on each side of the bud. To make the anchoring pins, single paper-clips are cut in half to make two U-shaped pins; thin but pliable plastic-covered wire is also suitable. It is important to ensure that there is good contact between the buds and the surface of the compost. Buds are planted as above in 3 inch clay pots that have been previously steam-sterilized. Sterilization can be achieved in various ways: by using a pressure cooker, by boiling the pots in a bucket of water over a gas ring, or by standing the pots on a perforated plate inside an electrically heated steamer or tea-urn. The compost used is a freshly made, fine mixture of 2 parts peat: 1 part lime-free loam: 1 part silver sand which is passed through a °" riddle and thoroughly steam-sterilized. No fertilizer is necessary at this stage. Each pot is well crocked, half-filled with gravel or coarse sand and topped up with the above mixture, which is pressed down gently using a flat-bottomed bung marginally smaller than the internal diameter of the pot. The top-most layer is passed through a particularly fine riddle and then gently pressed as above. The pots may be sprayed with orthocide Captan, prepared according to the maker's recommendations which can help to prevent fungal contamination. The pots are covered with clock-glasses and left to stand for at least 24 hours before use. Buds should not be planted on to a dry medium and it is therefore important that the prepared pots be soaked overnight so that the compost is moist (but not wet). This is achieved by standing the pots in a tray containing about 1" of water. After planting the bulbils, each pot is covered by a clock-glass, placed convex side up so that any condensation runs to the edge of the glass and drips harmlessly off the rim of the pot, and stood in a covered frame to maintain a humid atmosphere. To encourage sprouting of the buds, the pots may first be put in a warm frame, where this facility exists, which is kept at a temperature of 70-75 F. Once young leaves start to develop from the buds, the pots are transferred to a frame in a cooler house; these are heated during the winter months to

maintain a temperature of 50°F. When individual pots become dry, they can be watered from below by standing them in a tray of water until the compost is moist throughout. Covered clay (but not plastic) pots can alternatively be plunged inside a frame in a bed of moist peat or sand, a method which prevents rapid drying out of the compost in the pot and obviates the need for frequent watering. The frame can be kept warm by means of a Humex soil heating cable. Warmth will certainly speed up the sprouting process, but success can nevertheless be achieved without complicated or expensive facilities: for example, the covered pots can equally well be plunged to the rim in moist peat in a deep wooden or polystyrene box, which is then covered by a sheet of glass and put in a warm place. The plunging medium should be thoroughly moistened from time to time. As the young plantlets grow, they can gradually be hardened off by the raising of the clock-glass, which can be propped up in stages by the use of plastic labels or sticks of varying lengths until it can be removed altogether.

As soon as the small plantlets are well-established, with a rooting system as well as young fronds (the latter will develop first) they can be potted up individually into 2 or 2½" pots. For these young plants, a slightly different compost is prepared using 2 parts peat: 1 part lime-free loam: 1 part coarse sand. Bone meal is added in the proportion of one 3" pot-per-bushel (= 4 gallons) of compost, and 'Aldrin' is added to counteract soil pests. The whole is thoroughly mixed before being steam-sterilized. After a thorough soaking the newly potted ferns can either be stood in a warm frame and watered regularly from below or plunged in moistened peat in a frame or box, but in either case they should be transferred to a relatively cool place (maximum winter temperature 45-50°F) as soon as the plants have become established. The young ferns will grow rapidly and will probably require potting on several times before they are ready for transfer to the garden. Potting of young plants can be carried out throughout the spring and summer but, if young ferns have not been potted on before September, it is advisable to delay potting (or re-potting) until the following spring. It should be noted that although heat can be used both to initiate bud development and to promote root growth in freshly potted young plants, older ferns require a dormant period in winter and do better if kept in an unheated house.

Cultivation of adult plants

For the adult plant an open, sunny situation with dappled shade would probably suit it well. Its parents are both woodland ferns, and so the hybrid would benefit from a mulch of peat, compost or rotted leaves, which, besides conserving soil moisture and retaining warmth in winter, will serve to keep down weeds.

One can often obtain useful information regarding the cultural conditions to give a wild plant by studying the ecology of the plant in its natural environment. Similarly, a knowledge of the habitats and distribution of the parents of a hybrid can be a useful guide to its probable degree of hardiness and cultural requirements. The ecological requirements of *P. braunii* in Europe seem to be shade, humidity and a soil rich in humus. It is very often found close to a stream or river in montane (generally mixed) forests on siliceous soils, most often over granite or gneiss, and it may also occur on acid soils in limestone districts. Its altitudinal range varies from 450m to 2000m. Although normally a forest species, it can also be found, as in the Floitental, Austria in open, rocky habitats, and this may well be a secondary condition resulting from the clearance of forest. In such places the adult plants are fully exposed to the sun, although shelter and humidity are afforded to the young fronds by the boulders amongst which they are invariably found. In such habitats **P. braunii** is again found close to water, a fact that suggests it would form an attractive subject for cultivation in a fern garden incorporating a stream or water-fall.

Although **P. proliferum** occurs in *Eucalyptus* forests from south-eastern Queensland to Tasmania it appears to reach its best development in the cool, shaded forest of mountainous areas. It ascends into subalpine woodland and at high altitudes just below the snow-line small plants occur in rock crevices or in the grass amongst the snow gums. Since this fern extends to relatively high altitudes, i.e. over 2000ft (600m) and up to 6000ft (c.1800m), one would expect it to be completely hardy in the British Isles. In fact experience at Leeds has led to a different

conclusion. Although *P. proliferum* grows well in a cold greenhouse in Leeds, it has not survived the rigours of the Yorkshire winter when planted outside. Similarly, some hybrids incorporating it (e.g. the synthetic hybrid with *P. setiferum*) are not hardy outside in Leeds, although they survive the winter outside in Basel, Switzerland. It may be not the cold, but the environment of a northern industrial town which is uncongenial to them. *Polystichum x dycei* is certainly more hardy in Leeds than its Australian parent, and is a good subject for outdoor cultivation. In a suitable place it will soon grow into a splendidly handsome plant, and indeed, because of its habit of forming proliferous buds, will eventually produce, even without any help, its own small family around it! Not two, but twenty-two for the price of one might be an apt description.

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†Peter Lee died in late autumn 1993. He cared for the fern collections of all Professor Manton's students and colleagues during his long career at the University Botanic gardens in Leeds [Mary Gibby].

Notes on Fern Books of E. J. Lowe

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After the death of Jimmy Dyce in December 1996 a large box of letters was discovered amongst his fern memorabilia. Of particular interest was a file of 30 letters sent by Edward Joseph Lowe to the first Secretary of our Society, George Whitwell. Lowe was one of the great Victorian authors writing several books of high quality when the fern craze was at its peak (see Hall,198). In these letters there is information on two books of particular interest. The first is *British Ferns* published in 1890 and the second a book which never seems to have been published.

BRITISH FERNS by E J LOWE

Four of the letters pass interesting comments on Lowe's classic work *British Ferns*. This book contains the most comprehensive list of fern cultivars ever put into any single volume. Being such a detailed work it was rather inappropriately published in the "Young Collector" series. Given its importance even to today's fern growers I hope these comments will be of interest.

In a letter of February 2nd 1890 Lowe announced his intention to write the book:

"I am writing a handbook of the varieties of British Ferns for a London firm to be printed before the Fern Conference of the RHS and Gt. Fern Show of July 22 & 23 [1890, MHR]. At that show I am asked to read a paper on the varieties of British Ferns and also to exhibit a collection of the most distinct varieties. I have now charge of the late Col. Jones' ferns and shall take a van load of ferns from here and from Colonel Jones' Clifton collection.... Unfortunately I am only given to March 31st to write the book (which will be 128 pages)."

The final book actually ran to 168 pages. Assuming he made the publisher's deadline this is proof that the work was really completed in around 6 weeks as Lowe claims in the Preface.

On March 4th 1890: "I have received the interesting work Ferns *of the English lake Country*. I want you to add what is new since that was published as Mr Barnes is too ill to help. I shall call attention to this work on Lake Ferns in my Handbook."

He did mention it on page 6, but unfortunately the letter received by Whitwell on November 15th 1892 revealed:

"I am very sorry for the omission of your name from deserved thanks. Unfortunately my sheet of thanks was lost in the post and I had to write what I thought was a duplicate by return and in the hurry I omitted to copy what I had said about you and another of my fern friends. A very severe illness and recurring illnesses caused these unfortunate omissions. They are added to my preface of the second edition which will soon appear. I am much vexed about this omission."

Unfortunately there was no second edition as such, there was a reprint in 1891 which had a page of errata and a corrigenda strip - but no acknowledgement of Whitwell. Nevertheless Lowe`s correspondence continued for at least 5 more years and ferns were freely exchanged between the two men in what seems to have been a warm relationship. There was a second reprint in 1908.

Finally on the subject of this book Lowe wrote on November 25th 1892:

"... I have had a note from one of the members of your Society saying he hopes I shall return to the old nomenclature, thinking it was mine. The nomenclature and classification of my Hand Book is by your President (Dr Stansfield) after the papers at the Fern Conference of RHSoc. Colonel Jones and Mr Fox had agreed to it and only Wollaston objected. A book would not be acknowledged that had not the nomenclature of Hooker and Baker but we removed all confusion by heading each on the page section Athyrium, section Polystichum etc. The division into groups, divisions, sections of Athyrium, Polystichum and Scolopendrium is entirely Stansfield's. I could not improve it, so adopted it. The only thing I did not adopt was using english names for new varieties. Fox and Jones had begun it and named three of their athyriums `Nellie', "Helena" and "Evelyn". How can we cross at once 4 or varieties, the complication must soon be very great and descriptive names useless. Old well known names I hope will not be altered but botanists

say latin names belong to species and not to varieties. All latin names have been removed for Narcissi and from what Stansfield said I think he would follow into English names."

In the published book Lowe begins his preface:

"The author of this Handbook is anxious to acknowledge the great help that he has received from his numerous fern friends. More especially are these thanks due to Dr F.W.Stansfield of Sale, without whose valuable assistance and suggestions (notably as regards classification) it would have been impossible to have written this work in six weeks."

While this preface does not make it clear that Dr Stansfield was entirely responsible for Lowe's classification, the evidence of the letters is unequivocal. Subsequent authors were either ignorant of this or overlooked it. For example Jimmy Dyce in *The British Fern gazette* (1963) said he was:

"..still using E.J.Lowe's classification..."

and Reginald Kaye in *Hardy Ferns* (1968) says:

"Lowe made a very detailed classification of the varieties of his day...."

It is most likely that at the time of writing neither Jimmy Dyce nor Reg1nald Kaye knew the true author of the system, as Percy Greenfield, from whom Jimmy had inherited these letters, did not die until 1970.

The comments on the use of latin names are still relevant today. The International Code for the Nomenclature of Cultivated Plants forbids the use of latin in cultivars named since 1979, much to the displeasure of Jimmy Dyce - and many of today s fern growers.

AN UNPUBLISHED FERN BOOK by E. J. LOWE

Looking through the old letters from E.J.Lowe to our Society s first secretary, George Whitwell, I was surprised to discover that in 1893 Lowe was planning to publish a fern book in several volumes. One that I had never heard of despite collecting fern books for many years. Lowe did publish a single volume called *Fern Growing* in 1895 but no other fern book after *British Ferns* in 1890. Reading the letters more information emerged.

1892 Nov 2nd: "Dr Stansfield has pointed out to me that your new society on ferns could help me with my new book of 4 vols on the vars of British ferns. I should be much obliged for fronds and illustrations, the fronds should be packed in damp moss as I am having them photographed to show all the undulations and irregularities which you cannot get from pressed fronds."

Lowe had obviously not joined our fledgling Society at this time but the proposed book already sounds like a mouth watering work. The photographs were taken by his son (see below, 1893 Sep 18th).

1892 Nov 15th: "Dr Stansfield said that I ought to get information of the findings of all the Lake District discoveries and he sent me the address of seven fern hunters. As yet yours is the only letter I have received. It would be a pity to omit an account of new discoveries from your district in a large work of 4 vols extensively illustrated, as it may be 20 years before another large work is published. If you will kindly help I may be able to obtain fronds of some of your finds from others. The first volume will contain Adiantum, Asplenium and Athyrium as there is to be an alphabetical arrangement. The publisher only gives me six copies, as it is an expensive work but I should like to deposit one of these somewhere in your district for reference for all of you. Have you a library with your fern society if so what would be a proper disposition of the work. I am writing the work for nothing so you will see I have no gain "Our Native Ferns" being all sold, a second edition was required carrying the work to the present date, and this will add more than 300 good varieties and the illustrations from these will be natural photographs showing all the undulations 'etc. "

Over 100 years later the Society still has no library!

1892 Nov 25th: ".....I think the species? being described alphabetically and then the scols, athyriums and polystichums would be in separate volumes."

By 1893 Lowe was obviously intensively researching the work, unlike his handbook of 1890 this was not going to be written in 6 weeks. A printed form of his letter paper first appeared in this series of letters on: (photocopy of page)

1893 Jun 19: New Fern Book in 4 volumes. "Vol. 1 not yet out."

Caption for Fig.1 - Printed writing paper advertising forthcoming fern book.

Like most letters, this one was a request for fronds but footnote gives some indication that perhaps Lowe was frustrated at the non-appearance of volume 1:

1893 Aug 25: "Can I borrow the third edition of the English Lake Country from someone for 2 or 3 days.... I am giving a portrait of Mr Barnes. P.S. Should like to know at once about aspleniums as they are in type for 1st volume."

Clearly the first volume was not quite ready.

1893 Aug 29th: "Many thanks for the fronds they arrived safely and 17 of them were photographed today. Do you know anyone who would like to change ferns I have a grand collection and only give the duplicates away.... You will see an account in Vol 1, I shall send the vols. as they appear to you for your society. You will like the illustrations from photographs...."

He writes about volume 1 with great certainty. The next letter for the first time indicates that the work will be increased from four to six volumes:

1893 Sep 1st: "New British Fern Book in 6 (printed page 4 altered in hand to 6) volumes. I am trying to induce the publisher to give a group of portraits of those who have done good work with fern varieties in the Lake District. I thought one of Barnes and I am promised one of the late Mrs Hodgson. I want <u>one of yourself,</u> Wollaston has promised me his, would you suggest Clowes and Forster or who else. I have a group in volume one of hybridizers in Vol. 2 of fern hunters, Vol.3 I should like to illustrate the Lake District. I am also thinking of a plate of specialists such as Druery, Masters, Baker and one or two professors."

Volume 2 is obviously progressing but there is an early hint here that the publisher is jibbing at Lowe's plans.

1893 Sep 9th:"Many thanks for your photograph, I have written to Mr Wilson for his."

1893 Sep 18th:"I have received the ferns safely and will send Mr Barnes back to you as soon as my son has photographed them."

1893 Oct 9th: "Your portrait that is in the group for Vol. 2 was sent to the printers at Driffield, but it turns out that Nimmo has these with a London firm. Fawcett says he posted it to Nimmo and Nimmo says he never received it, have you another copy? I also want to know a few details for memoir when you were born, where born, when you commenced ferns where you have hunted ferns, and what good varieties you have found. Your connection with the Pteridological Society of the Lakes and adding anything you like about your society so as to bring it prominently forword. The group of portraits consisting of Col. Jones, Major Cowburn, Clapham, Mapplebeck and Fox is very well done."

This is rather an ambiguous letter. At one point it seems as if Nimmo has volume 2 but it later appears to be lost. Perhaps Nimmo has only placed the portraits of volume 2 with the London firm and thus only the portraits were lost and Fawcett still has all the text? The other group of portraits mentioned here was published in *Fern Growing* in 1895.

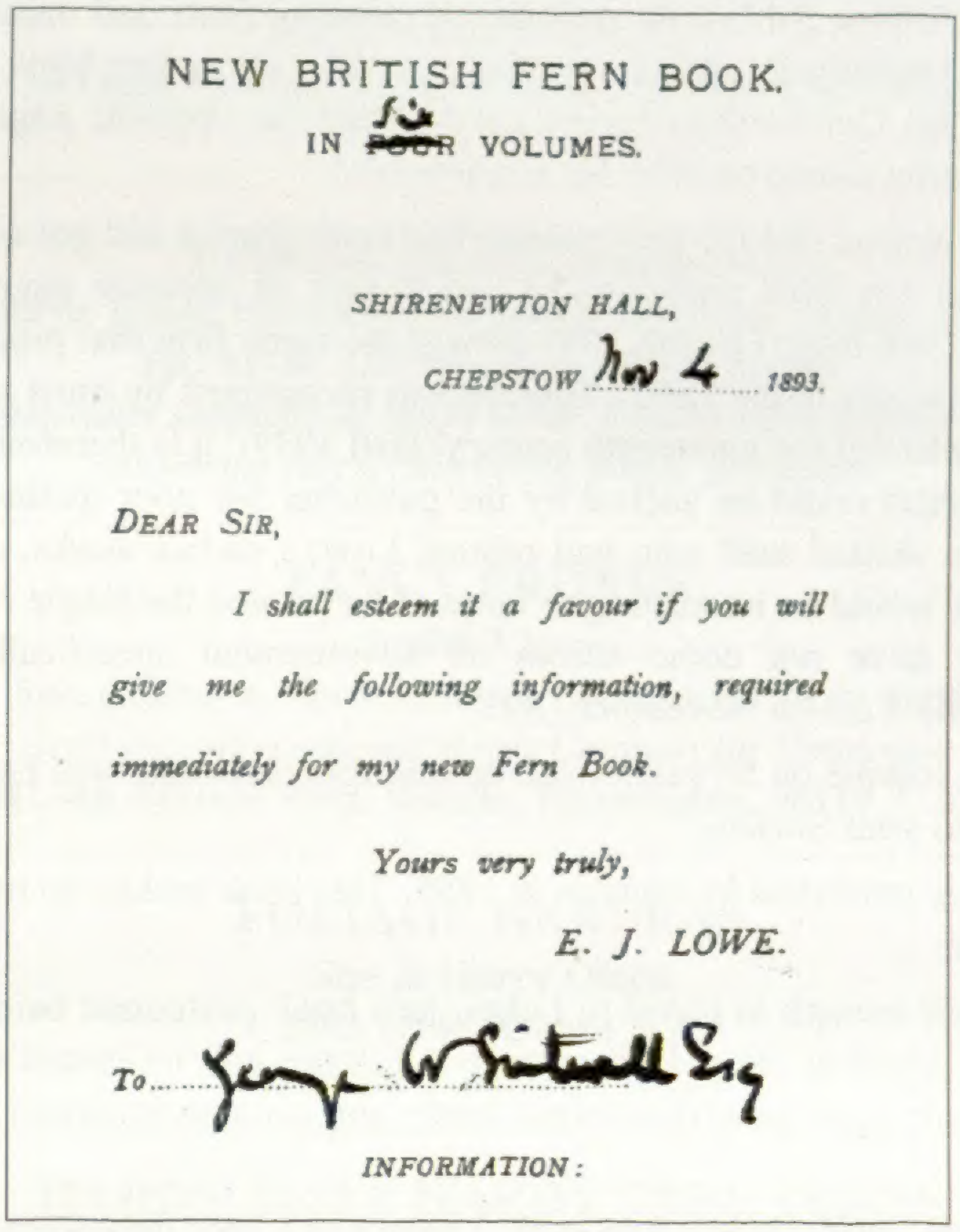
1893 Oct 18th: ".... Your portrait is now in hand and will appear in Vol.2 in January.... I have been trying to get you a couple of copies of my Handbook and have as yet only succeeded in obtaining one which I send you."

1893 Nov 2nd: "Vol.1 now ready and binding. P.S. I shall send the book to you and you can arrange for others in your district to see it."

Volume 2 is due to appear in January and as the next letter states Volume 1 is already at the binders, it seems as things are moving on apace.

1893 Nov 3rd: "New Fern Book in 4 volumes."

Although the number of volumes was not changed to six, this was probably due to his haste and his sense that it was irrelevant in the context of the number of letters he was writing to Whitwell. By the next day he was back to 6 volumes!



NEW BRITISH FERN BOOK.

IN ~~FOUR~~ VOLUMES.

SHIRENEWTON HALL,

CHEPSTOW Nov 4 *1893.*

DEAR SIR,

I shall esteem it a favour if you will give me the following information, required immediately for my new Fern Book.

Yours very truly,

E. J. LOWE.

To George W Whitwell Esq

INFORMATION:

1893 Nov 4th: "Did I ask you for a few details for a memoir. Your portrait appears in Vol 2, and I have short memoirs in an introduction that must go to the printers next week."

Volume 2 is now expected to arrive at the printers in mid November.

1893 Nov 9th:".... I shall be glad to give you any of my best in the hopes that you may help me as regards the Lake ferns for I want to grow plants that none may be missed in my fern book, as the appendix volume will be printed after next summer s growth the last volume coming out in October. Vol 2 athyrium will appear in January. Vol 1 in a few days.

P.S. I don`t know if you care for me to join your society if you do I shall be glad to belong to you."

It appears to be still progressing well and at last after extracting much priceless information from Whitwell, Stansfield and others he enquires about joining the Society. There might have been some reluctance to join on his part because all the original members were from the north and he might have felt he was intruding.

1893 Nov 11th: "... As regards your society use your own judgement, if I can help in any way I shall be glad."

1893 Nov 23rd: "New Fern Book in (4 crossed out) 6 volumes. Vol 1 is not yet out, it is done but there has been a miscalculation as to cost and Mr Nimmo says he must either increase the price or diminish the number of illustrations, I say increase the price. He's holding it back until this is settled."

Now there is clear confirmation of Nimmo s reluctance to go ahead. Lowe was then seriously ill for several months and perhaps lacked the energy to pressurise Nimmo.

1894 June 30th: "I beg to acknowledge the letter just received announcing that my name has been added to that of your members. When you print it add FRS & FLS. I should have written

to you long since but have had a severe illness though I am now comparatively well again. This has interfered with the fern book and the publishers having had a dispute as to the way the printer was doing the book determined to defer publication until I had written the whole of the volumes when he will place it in some other printer's hands and print all the volumes at once. He will however in August publish the volume on crossing ferns and multiple parentage as a separate work. I have raised a lot of fine varieties.....Vol 1 of my fern book was all printed and sent to the binders last October but the ink used dirtied the opposite page so this work was stopped instead of being issued on Nov 1st as advertised."

Here we have confirmation that the first volume had been printed and got as far as the binders, but the ink used had not dried properly and had dirtied all opposite pages. The printer was Fawcett of Driffield (see letter Oct 9th 1893 above) the same firm that produced all of Lowe's better quality colour works in the 1860s. Fawcett was recognised 'by most authorities as one of the finest colour printers of the nineteenth century'(Hall 1979), it is therefore extraordinary that such a reputable printer could be sacked by the publisher for poor quality printing. Perhaps Fawcett had lost the skilled staff who had printed Lowe's earlier works, or perhaps Fawcett himself was dead. It would be interesting to know if he printed the single colour plate in *Fern Growing* (1895). I have not come across an advertisment specifically announcing the publication of Volume 1 on 1st November 1893.

1894 Aug 4th: "My volume on 50 years work on multiple parentage will be printed in a month when I will send it to your Society."

This is *Fern Growing* published by Nimmo in 1895. This book makes no mention of any other works in preparation.

1894 Aug - "Not well enough to travel to Lakes, fern book postponed being issued till winter when it will all be issued at once. In meantime a volume will be issued describing multiple parentage. I have made some good discoveries lately and am almost certain to master evolution of sex."

1895 Sep 25th: "I now send you my fern book. I have had a long dangerous illness from which I am now recovering."

Even *Fern Growing* was a year late in appearing.

1896 Aug. 2nd: "I am unable to attend your meeting but I write to say that my work on the varieties of British Ferns will be printed in November and will contain some hundred of illustrations from photographs... I expect the work will be in 6 volumes and will be devoted to the varieties of British ferns."

Despite the publication of *Fern Growing* the full six volume work is still in the pipeline.

1896 Sep 3rd "Will you kindly send me the names and addresses of those that have good new ferns for my fern book, I expect it will be out before Xmas. Druery sent me some nice varieties today. "

Publication date has again slipped back from November to 'before Xmas'.

1896 Nov 7th: "I should much like a crested lonchitis Mr Boyd sent me four nice plants but weevils destroyed them this summer. I have not got any fronds or information for my fern book which I much regret as Stansfield said there were some that ought to go into my fern book."

This is the last letter in the collection. Does it represent the end of the saga? Lowe is still soliciting material so the book was clearly not finished, *Polystichum lonchitis* would have been in the final volume in an alphabetical arrangement as outlined in his letter of November 25th 1892. So presumably everything else was written. He had clearly not given up.

What happened after this is not known but presumably the manuscript never went back to the printers. Hundreds of priceless photographs and five year's of concentrated research by *the* fern man of The late 18th century seem to have come to nothing. Unless the manuscript is still preserved somewhere out there...?

Lowe died in 1900.

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